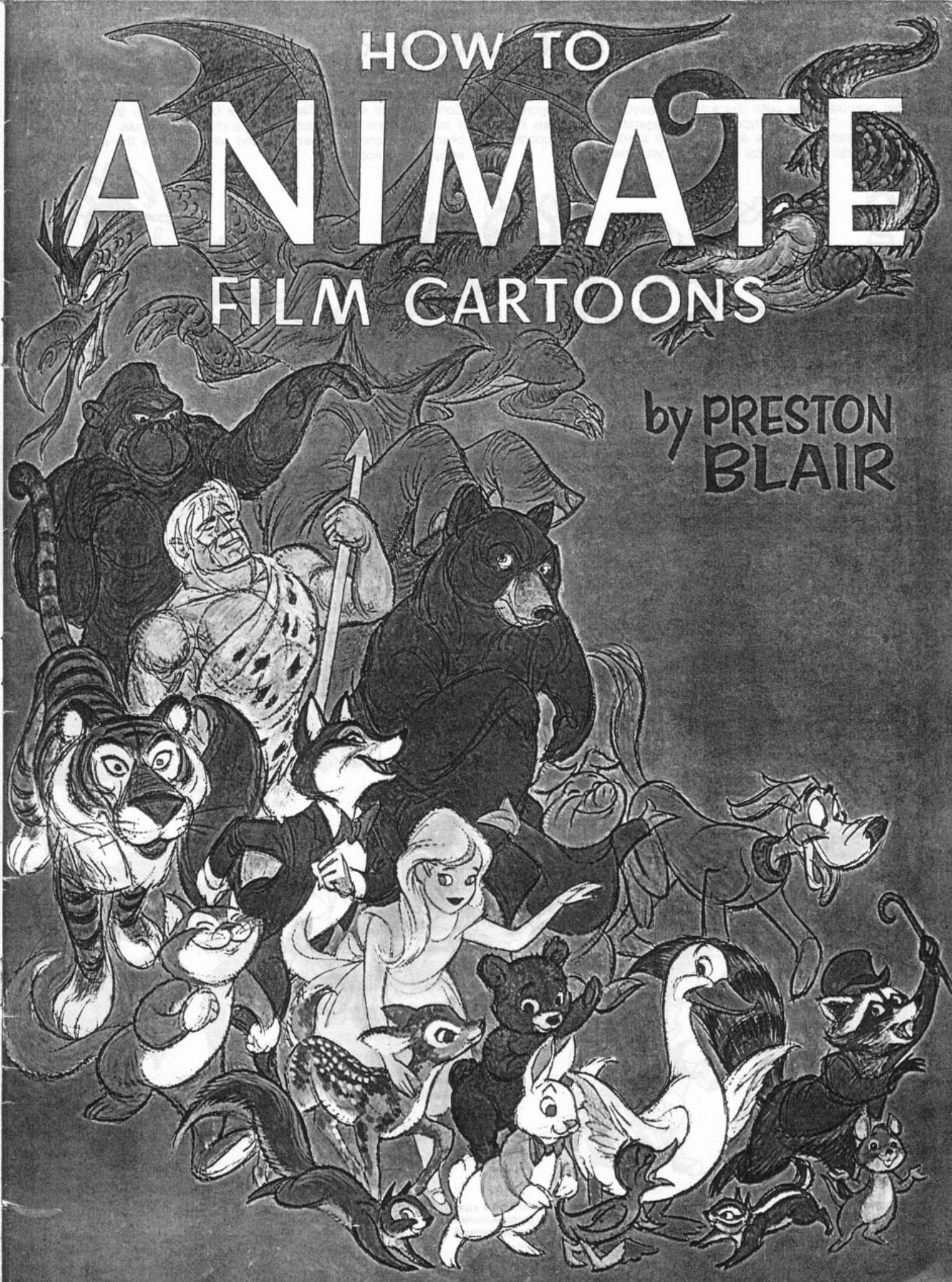


HOW TO ANIMATE FILM CARTOONS

by PRESTON
BLAIR



Dear Art Enthusiast,

Today may be your first lesson using a Walter Foster art book...or it may be a continuation of a long-term relationship with us. Either way, this book will delight you.

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Best Wishes,



Ross Sarracino
Publisher

What You Will Learn From This Book...

- Cartoon construction, including proportions, stance and features
- How to animate by using the "pose-planning" and "straight-ahead" methods
- Tips on timing and spacing patterns, accents, beats and scene timing
- The differences between planned, cycle and limited animation and animated cut-outs.
- How to plan your composition, staging and backgrounds
- Cartoon attitudes, emotions, gestures, reacting, dialogue expressions and pronunciations
- Instruction on balance and movement, paths of action, and the wave principle
- Tips on speed, impact, weight, and recoil and effects



About the Artist

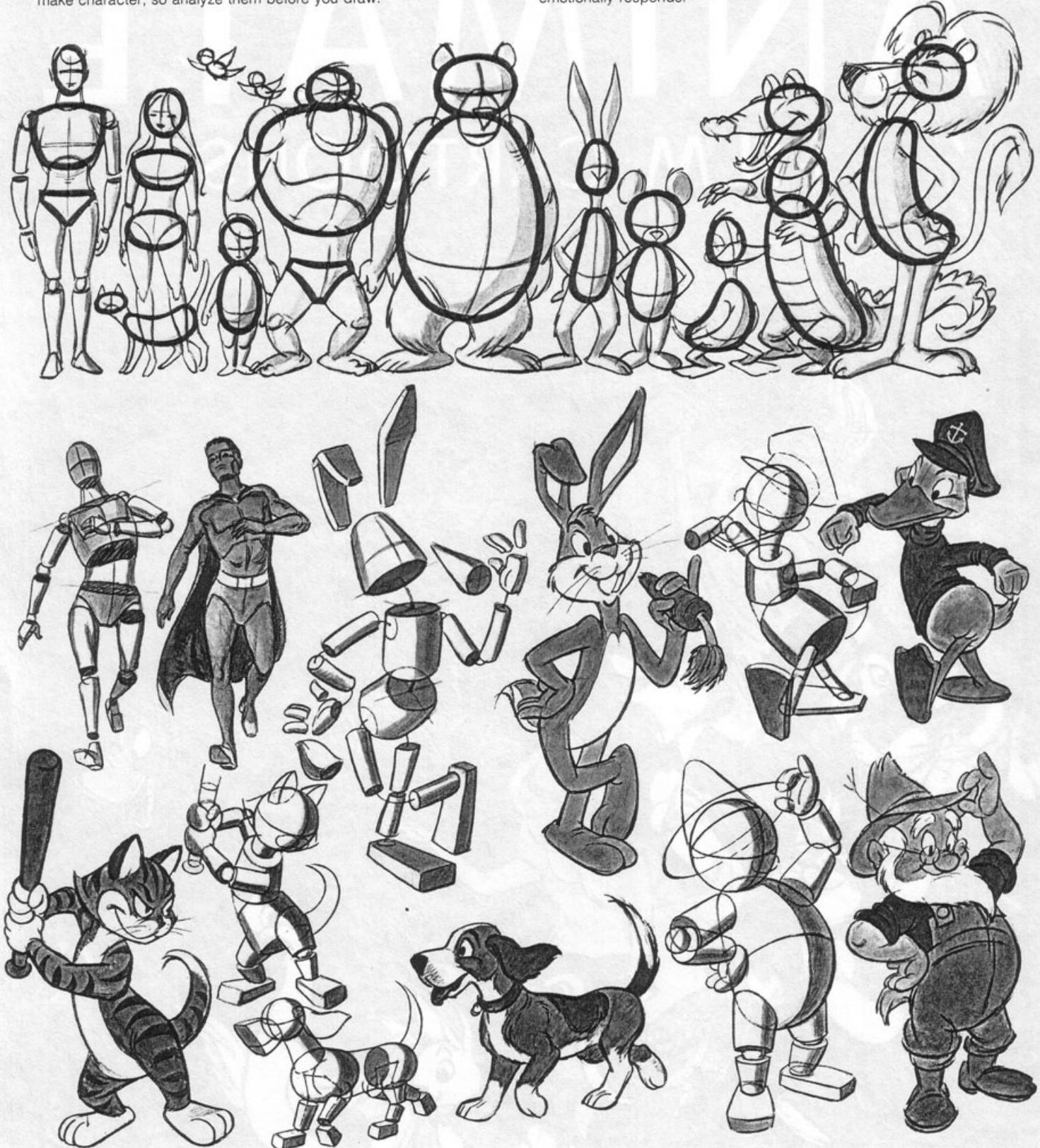
Preston Blair is a native Californian from Redlands. He attended Pomona College, then studied art at the Otis Art Institute, and illustration under Pruett Carter at Chouinard. He has exhibited widely as a member of the California Watercolor Society and the American Watercolor Society in New York.

Preston is one of the fine artists of animation. With the Disney Studio, he designed and animated the the hippos in "The Dance of the Hours," and animated Mickey Mouse in "The Sorcerer's Apprentice," — both in "Fantasia," parts of "Pinocchio," and the segment in "Bambi" when the owl tells about love in his "twitterpated" speech. At MGM, Preston directed "Barney Bear" shorts, and is well known as the animator and designer of "Red Hot Riding Hood" in the Tex Avery epic shorts. Later, Preston moved to Connecticut and produced television commercials, educational films and half-hour cartoon episodes (including "The Flintstones") for west coast producers. He is now an inventor of interactive TV systems using animation methods to teach reading — or to provide full figure game action (such as tennis) with an animated opponent on TV that simulates reality.

CARTOON CONSTRUCTION

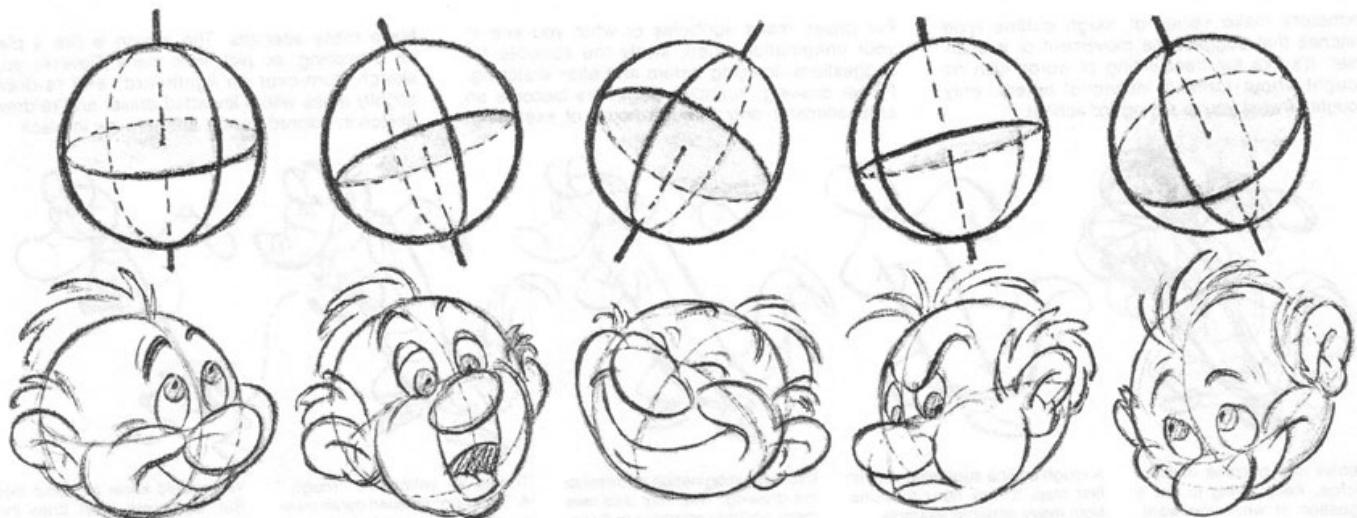
PROPORTIONS The heavy pugnacious character has a small head, large chest or body area, and heavy arms and legs. His jaw and chin protrude. The cute character is based on the proportions of a baby. "Screwball" types have exaggerated parts. Cats have a wide head, small nose area, and pear shape body. Proportions make character, so analyze them before you draw.

STANCE—SOLID MASSES Draw a "Line of Action" through the three dimension parts to organize and set the attitude or action. Construct your drawing like you were fitting together the parts of a puppet at the joints according to a character formula. Thus your character becomes believable, and when he acts the audience emotionally responds.



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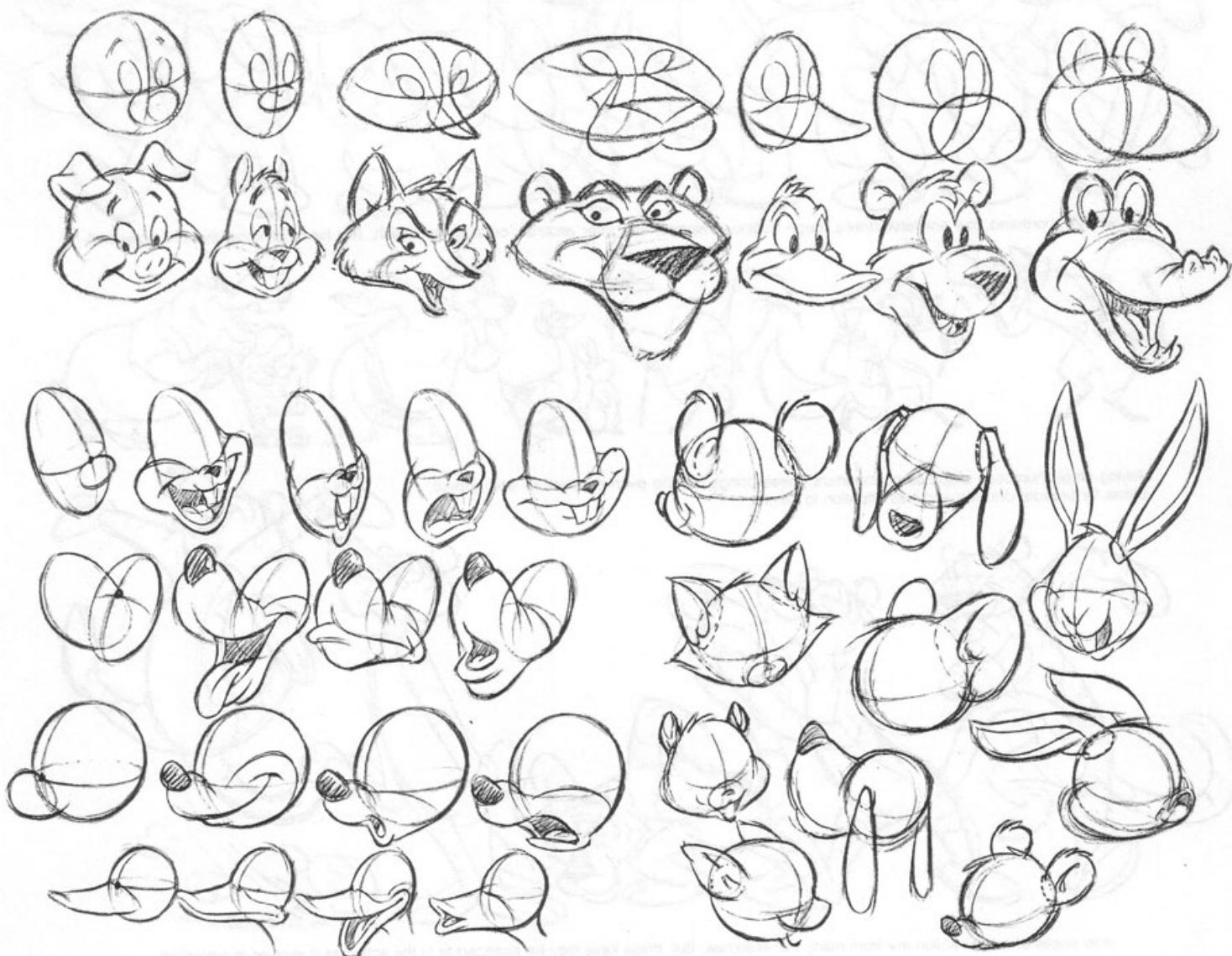
HEAD CONSTRUCTION - TILT



TILT Draw the vertical center guide line and then the horizontal line around the head mass. This sets the perspective-tilt of the head that is the basis of many expressions. This tilt constantly changes in many actions, especially in important dialogue scenes. Anchor the eyes, nose, and ears to these guide lines.

HEAD CONSTRUCTION The cranium circular mass is ball, oval, or pear shaped according to the character. The horizontal guide line can circle the center, upper, or lower part of this mass. The eyes fit above this line, and the nose area fits below the line. These features remain fixed to the head as part of the cranium mass.

FLEXIBLE FEATURES As the jaw moves the mouth and cheek form is very flexible and changes to many forms creating expressions and mouth positions in speech. The eyebrows and ears are also flexible, but note that the base of the ears and the nose remain fixed to the head. The eyes are flexible within fixed sockets.



SKETCHING BASICS - A SHORTHAND ART

Animators make series of rough outline type sketches that suggest the movement of a character. It's like the handwriting of words with no thought about forming individual letters, only thought of what you're saying (or acting).

For poses make scribbles of what you see in your imagination, then, study the scribble for suggestions. Imaging before and after sketching. Forget drawing, scribble! Beginners become an artist-animator only through hours of sketching.

Make many attempts. The sketch is like a plan for a building, so pick from many. Reverse your sketch (turn-over on lightboard) and re-draw. Slightly erase with a kneaded eraser and re-draw. Sketch in colored pencil, and re-draw in black.



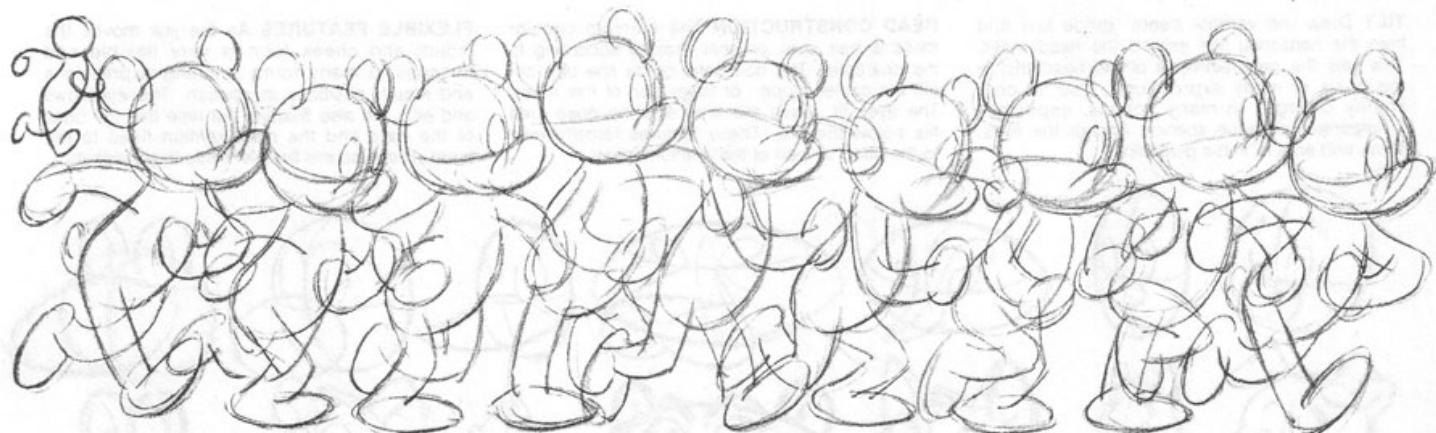
Scribbles can become multiple sketches. Keep trying to get a suggestion of what you want.

A rough outline suggestion is the first step. It may have to come from many scribble attempts.

Use your imagination to develop the drawing. This may also take many scribble attempts to finish.

This is an animator's "rough." A "clean-up" finished detail drawing is made from this basis.

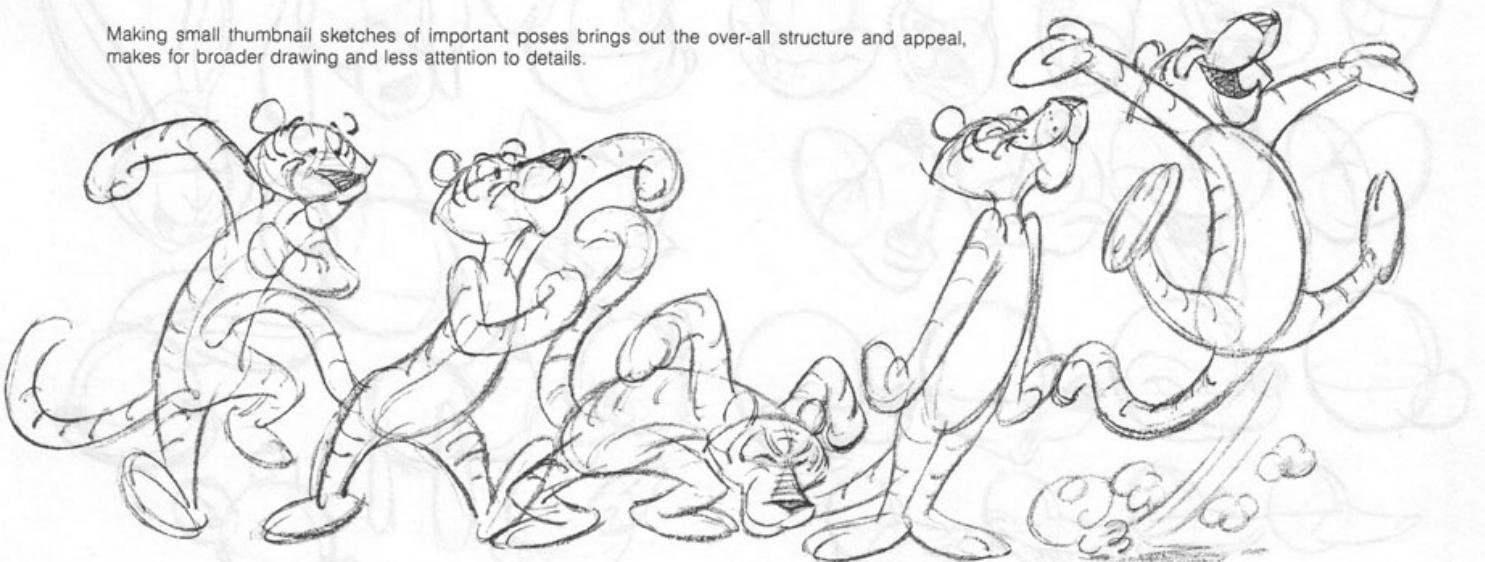
You should know all about this. But, animators don't draw this skeleton first, they sketch outline.



Like writing shorthand, the animator draws rough outline sketches, one after another, creating an action. But he must know the character well.

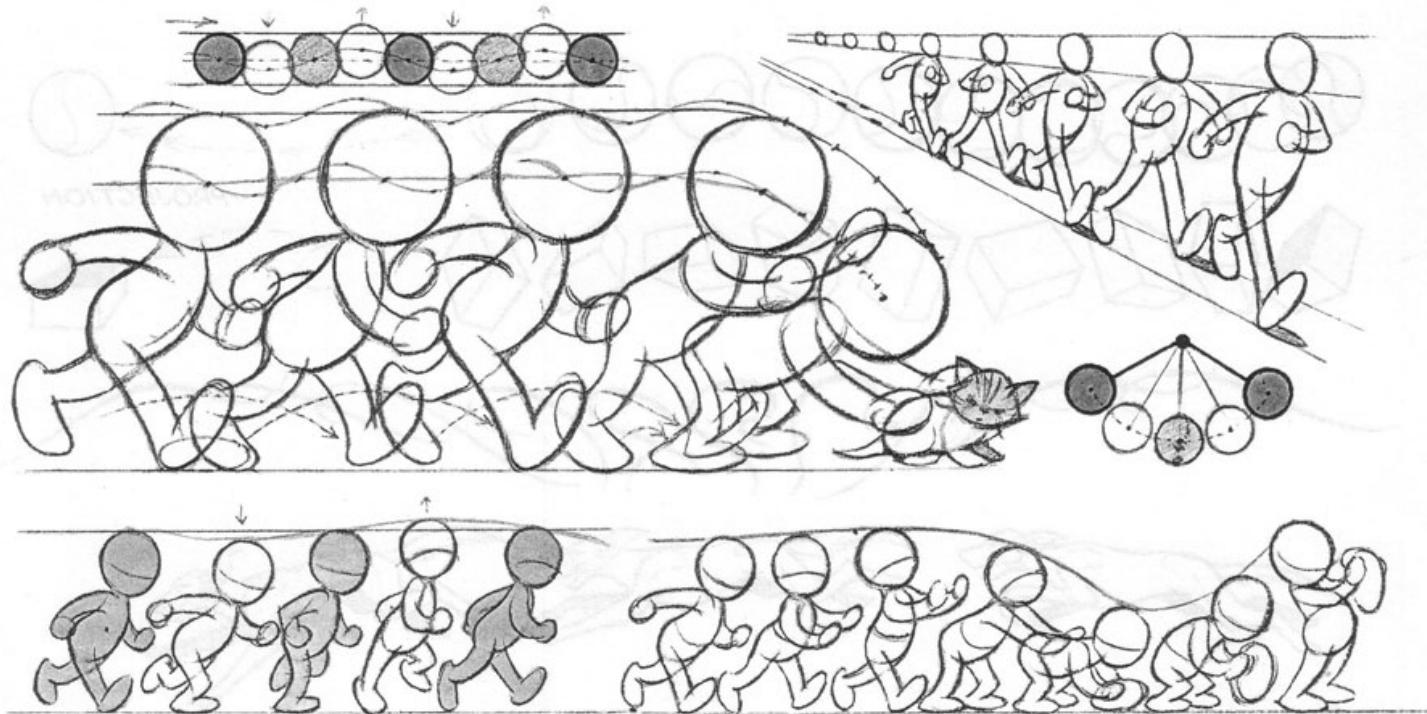


Making small thumbnail sketches of important poses brings out the over-all structure and appeal, makes for broader drawing and less attention to details.



Key poses of a tiger action are from many trial sketches. But, these keys may be changed to fit the action as it evolves in animation.

ANIMATING WITH POSES-EXTREMES



There are two distinct methods of animating. A third method combines the best features of each.

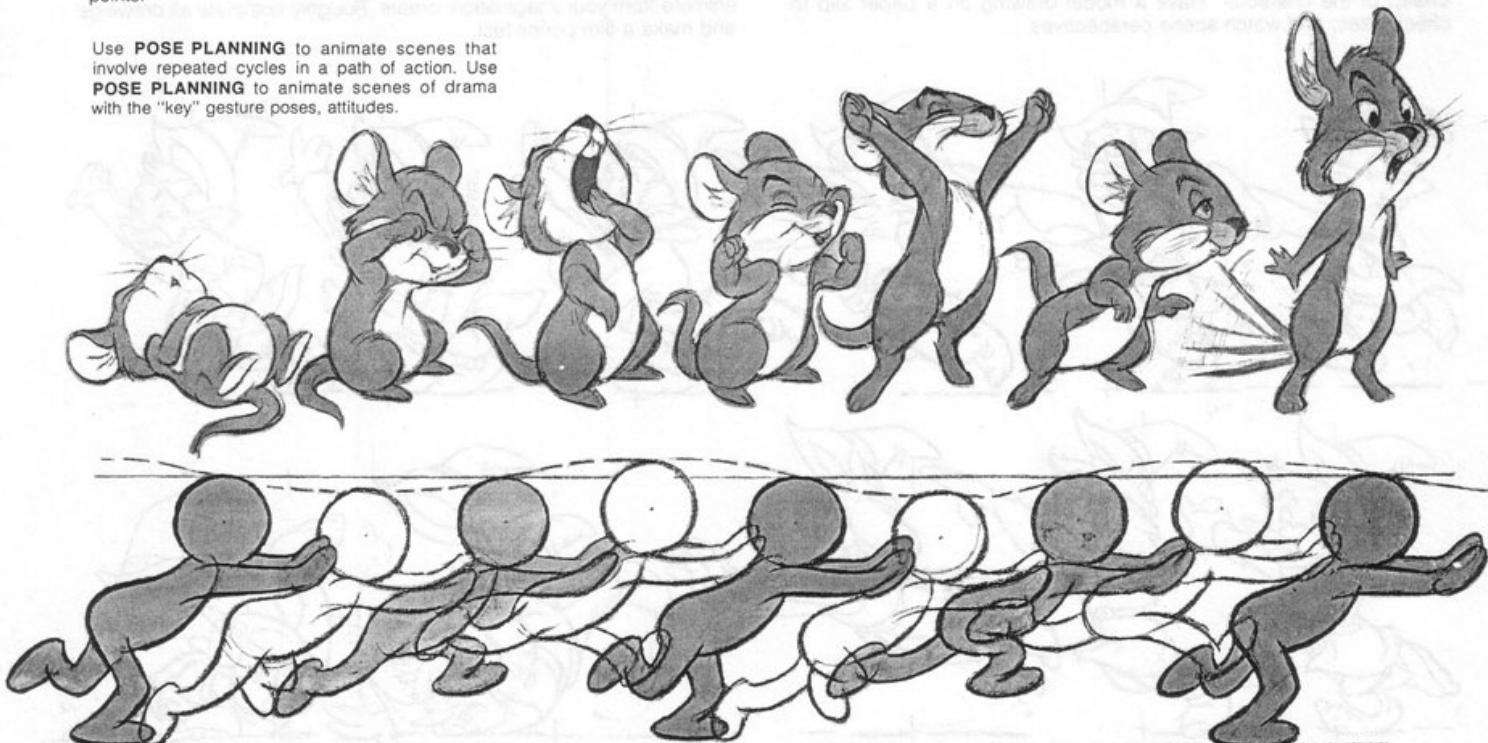
The original basic method is "straight-ahead." It is simply drawing one move directly after another in an evolving sequence of growth. A plant grows "straight-ahead." Drawing dots, one after another in a flip-book is "straight-ahead."

The second method is "pose planning" as here illustrated. "Key-poses" (Like the mouse below) are first sketched that plan the "extreme" positions in an action. These are carefully thought out in regard to the action, dramatic presentation, interpretation of mood, reinforcing the story, scene composition, and drawing points.

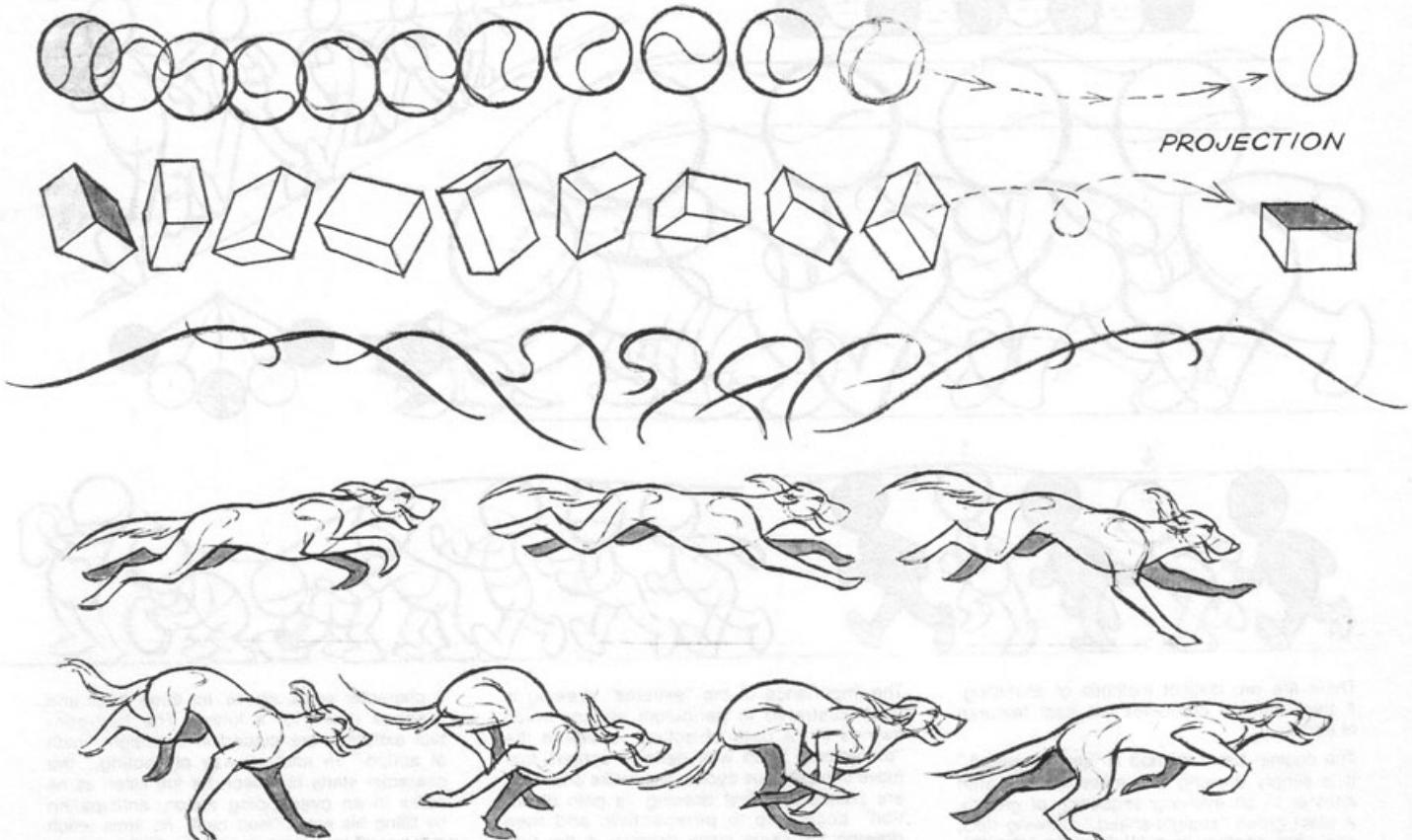
Use **POSE PLANNING** to animate scenes that involve repeated cycles in a path of action. Use **POSE PLANNING** to animate scenes of drama with the "key" gesture poses, attitudes.

The importance of the "extreme" drawing is best illustrated in pendulum action, which swings in "a path of action" between the "extremes." Such well defined actions that move in repetitive cycles, like walks and runs, are planned by first drawing "a path of action" according to perspective, and then drawing the same cycle drawing in the progressing positions. The remaining "inbetween" drawings are planned with spacing charts that also indicate the "arc" of the action. Such guides are placed by the animator on his "extremes" if other artists complete the scene. Animation between "extremes" is rough-in by the animator. The inbetweens can radically change an action, greatly improve it, or badly stunt it.

A character walks, above, for three steps and reaches down for a kitten. The foot-contact extremes are placed in a straight "path of action." In another way of "acting," the character starts his reach for the kitten as he walks in an overlapping action, anticipating by lifting his arms, head back. As arms reach out, head stays back in balance to thrust, and follows through later in an overlapping action as kitten is lifted. The later is a better animation job, but, the acting as it fits the mood and story is the essence, and there is a time and place for each approach. Pose planning is vital to acting scenes like the mouse below. Such scenes are based on the drama, gesture, or attitude of poses, and not action.



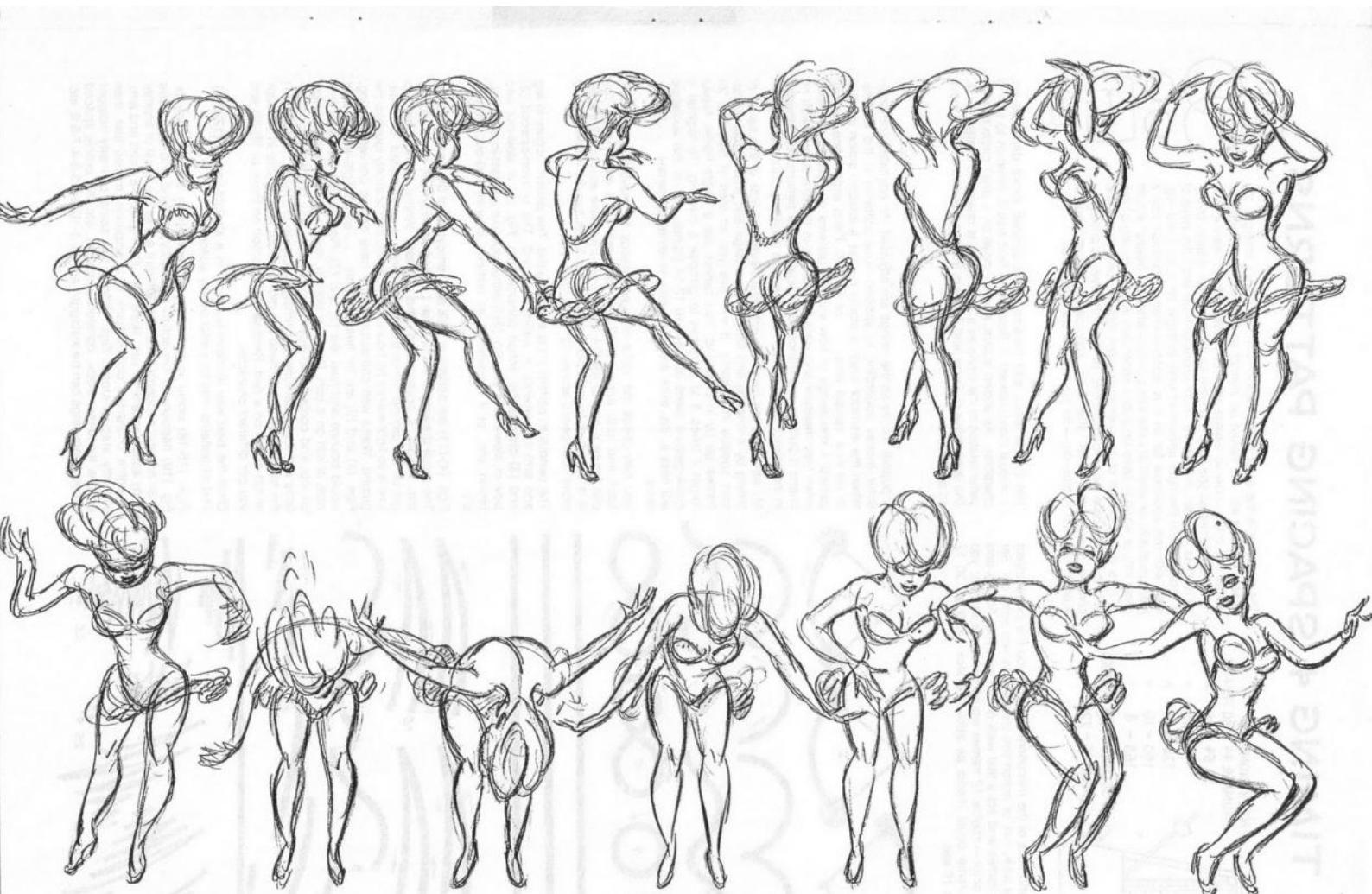
STRAIGHT-AHEAD + RHYTHM ANIMATION



STRAIGHT-AHEAD ANIMATION or drawing each move from the start in a growth sequence is used for action involving rhythms in the character movements. There may be several overlapping secondary actions moving in a character, and each has a different timing and rhythm. These are started unevenly by turns, twists, and other body actions. They are impossible to pose-plan, and many are discovered as you animate straight-ahead. Start with a plan of action in mind, work with rough sketch-scribbles and rhythm lines, and aim for the sweep of the character. Have a model drawing on a paper slip to check sizes, and watch scene perspectives.

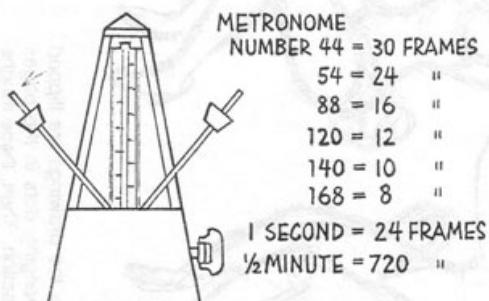
A METHOD TO ANIMATE Visualize the entire scene with projection poses at the most important points. With these drawings as a guide make "paths of action" if practical. Then animate "straight-ahead" from the start toward the first pose. When you near this pose use it only as a guide, and do not work into it unless it fits the flowing rhythm progression of your action. Don't hesitate to revise. Discover improvements as you progress. Research the scene by acting before a mirror. Study live-action film research. Make thumbnail sketches. Then animate from your imagination, create. Roughly complete all drawings and make a film pencil-test.



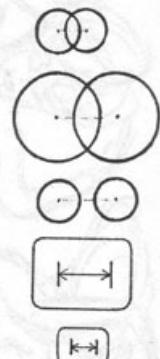


This dancing girl action is built like stacking building blocks, one on top of another. The first drawings are rhythm-scribbles. As each is made the drawings are flipped to study how the action is progressing. When complete, and all the sketches are on the pegs, the actions may be revised, and revised, like changing dots in the pages of a flip-book. This girl's leg did not swing high and wide at first. I made a series of scribbles over the first crude sketches that revised this action. Then, these roughs were made of what I imagined seeing in these forms.

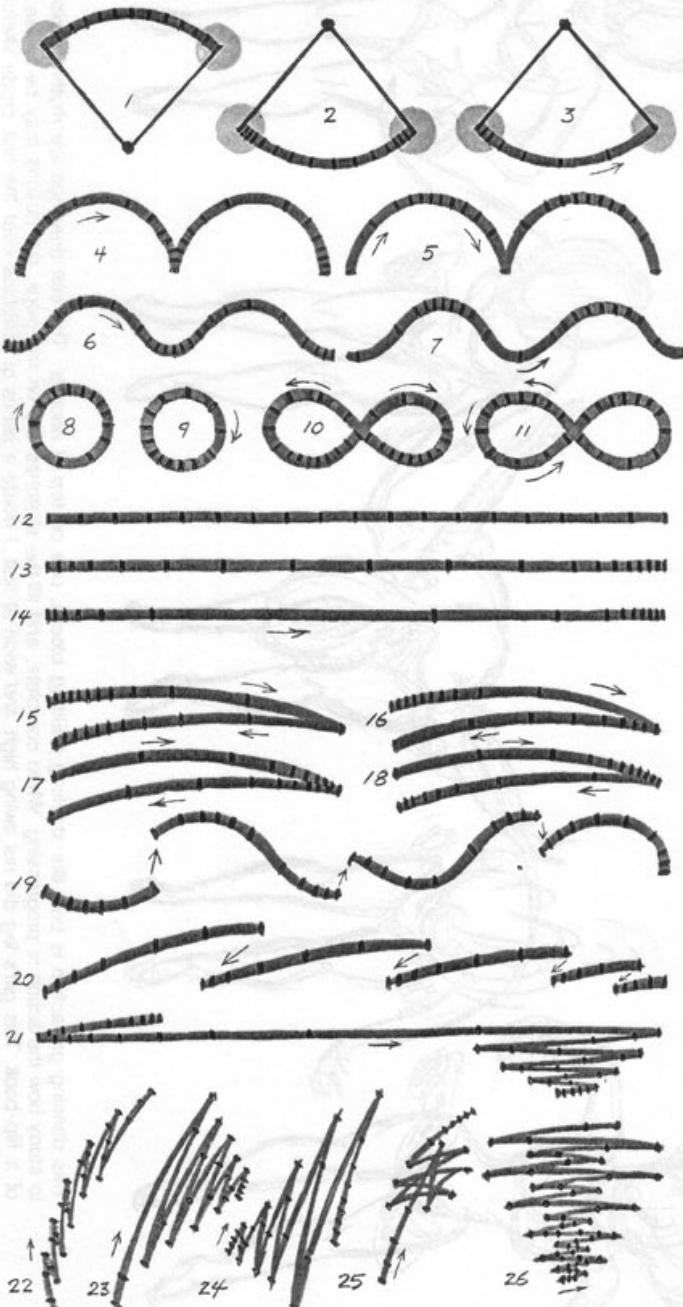
TIMING + SPACING PATTERNS



The animator is the actor of the cartoon film. An actor's timing is the essence of the art, it is based on instinct and personality. The actor learns the craft—how to always walk or move with a meaning—to never pause unless you have a reason for it—when you pause, pause as long as you can. And so the actor-animator must learn the value of a "hold"—and the right amount of time to linger on it, so it will register with the audience for all it is worth—when to cushion into a hold gradually, or when to jump into a hold—when to "freeze" a hold dead still, or when to keep up subtle secondary actions during a hold to give it that breath of life—when to start little actions during the hold that anticipate the following move, or move the eyes to anticipate coming movement—when, after such anticipation to jump out of a pose, or when to slow-out—for such is the craft of the art.



The swings and ticks of the metronome can tell you the exact speed in frames of a walk, run, or action you visualize as you act it out. Set the arm at 8 frames and act a fast walk or run with your fingers and hand as the actor—maybe 12 frames would be closer to what you want. Make frame count marks as above. Check clock so 30 12 frame ticks fit 15 sec.



The filmed result and meaning of a spaced move depends on: 1. Actual measurement 2. Relation to field size 3. Relation to size of character. As shown above, a small move on a small circle has the same relation to the circle as a large move is related to a large circle. The large move on large field appears the same on film as small move on small field.

A puppet moves as the strings are adjusted. An animated film character moves according to spaced-move patterns in the actions. When the animator starts a scene he has a specific action in mind to do in a certain time . . . or frames. From experience he has gained a knowledge of how specific patterns of spacing will work when they measure and path the actions in the character. Often he charts a pattern in advance, but usually these patterns are inherent in the animation structure . . . and evolve intuitively during animation.

My advice to the beginner is to first develop a little of this sense of timing by animating and film testing a large and small circle in various speeds in patterns. It will give you an idea of how fast 24 frames go by in a second. You cannot see a single frame. Never forget it takes 3 to 5 frames to glimpse a drawing. To register a quick-gesture takes at least 10-12-14 frames . . . or the audience will miss it. So, think animation only in series of frames . . . in patterns.

You can check the looks of even speeds by moving your pencil back and forth across a 12 field as timed by a metronome. You can figure it out: at the 24 frame tick, one move across 12 inches is a speed of $1/2$ inch per frame, and it takes two 24 frame ticks to move your pencil across 12" at $1/4$ inch, etc.

The pendulum pattern (1) is even spaced. The pattern occurs in leg and arm movements in walks and runs. The uneven-spaced (2) and (3) change the action considerably. Fig. (2) is slow-out and slow-in, slow-out-in, etc. Fig. (3) is either slow-out and fast-in, slow-out, fast-in, etc., or it is reversed as fast-out, slow-in, fast-out, slow-in, etc.

Figs. (4)-(11) are actions in walk and run cycles of the head or body. The recoil drawing is at the base . . . and when time is spent around this, weight is accentuated. The creature simply cannot seem to get off the ground. When the high drawing is accentuated, the creature is so light-weight he bounces up, floats, and scarcely touches the ground. Walks with character usually have certain uneven-spacing. Figs. (4) and (6) are for heavyweights . . . and a light-weight deer would bounce and float like (5) and (7). Figs. (8)-(9) are usual in a walk or run on a pan. Recoil is bottom, rise to left mid-way up, high on top, and contact mid-way down on right. Any of these four positions can be accentuated in timing to create character. In (10)-(11) the head or body and head are moving from side to side in the walk or run action on a pan. Reverse the direction on these or (8)-(9) and you get different character.

Often the best way to move is simply in a straight-line as (12)-(14). And all patterns may be better evenly spaced.

Figs. (15-18) occur in hand-arm movements in various accents. Fig. (19) happens in live-action constantly. A hand and arm move in an arc and suddenly jump to a different arc as the result of another body action accent, or jerk, like a kick. On Fig. (21) a hand and arm, or entire character, comes back in anticipation, moves fast, then violently stagger-stops. Figs. (22-25) are some of many stagger actions for takes, stops, collisions, crashes, etc. An evenly spaced series of drawings can be a stagger-action: 1-10-2-9-3-8-4-7-5-6, etc.

ACCENTS - BEATS - SCENE TIMING

BEATS	SC.3	6	7	8 SC.4	9	10	11
DIALOGUE	ALL I DO	15 HAVE	← FUN	BUT I'M HUN	GRY	SOME TIME	
ACTION	GRASSHOPPER	SINGS SONG		DUCKLING & KITTEN	LISTEN TO GRASSHOPPER		
EFFECTS	C.U.			CUT L.S.			
MUSIC							

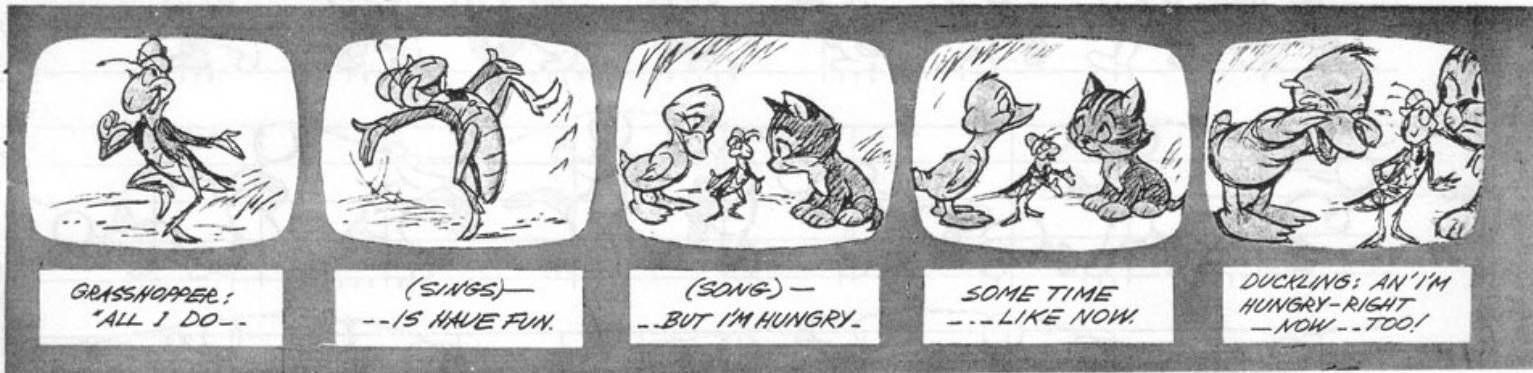


A **STOP-WATCH** starts and stops with the push of the button. The animator thus times his acting to plan the amount of frames for each action. Some watches have footage scales. A second hand of an electric clock, the metronome, or live action film research can also be used for scene timing.

The **STORYBOARD** and **SCRIPT** are the building plans like a blueprint, and on this foundation the film is constructed. Each scene is described in the script for picture and for sound. The scene title describes the characters, sound, and the type as a **CLOSE-UP**, **MEDIUM CLOSE-UP**, **MEDIUM SHOT**, **MEDIUM LONG-SHOT**, or **LONG-SHOT**. The transition from the scene to the next is described as: **CUT-TO**, **CROSS-DISSOLVE**, **FADE-OUT**, **FADE-IN**, **TRUCK-BACK-TO**, **TRUCK-DOWN-TO**, **WIPE**, **IRIS-OUT**, **IRIS-IN**, or animated metamorphosis. Layout drawings based on the storyboard are made of the background and key character positions. Dialogue and music is recorded and a film-editor "reader" measures and writes down the exact frame position on the **BAR SHEETS** and **EXPOSURE SHEETS**. The music or **BAR SHEETS** plan the production timing of all the scenes into a film.

The **EXPOSURE SHEETS** plan the animation production timing of an individual scene. Every frame, foot, and scene has a number. Every music beat, action accent, word sound, or any timing detail has a number. For a drawing to appear in "sync" with a sound accent, the drawing should be exposed 2 or 3 times **before** the sound. Many animators do this, but the usual way is to simply animate **exactly** to the same frame as the sound, then later shift the entire picture film, 2 or 3 frames ahead of the sound track during film editing. Sound accents can be "hit" by **any** radical change in picture timing. This means sudden starts as well as sudden stops, jumps, and action reversals or freezes. Sudden slow spacing or sudden wide spacing in a continuous action can accent a sound. And, think in series of frames . . . you can't see anything else.

Accents on walk and run cycles come at the recoil-bottom or high point drawings. Most action and dialogue can be on 2's. When the action is fast with wide spacing use 1's to avoid too wide jumpy spacing. The 4 cels over the background in cartoon films allow 4 action levels. Also, parts of a character can move on one level (12A-E), while the other parts are held on the next level (12). Don't do anything vital in the first 5-6 frames of a scene, and important dialogue should not be there. TV Bar Sheets as above have a foot (16 frames) per bar. Theatrical music-bar sheets vary in bar length to fit the music mood of the film. Dialogue and music is planned in these bar sheets by stopwatch. Music is then composed and recorded with dialogue and the scene timing may have to be adjusted to fit. Adjust & change is constant in films.



PRODUCTION #34 - THE LOST KITTEN

VIDEO

SCENE 3. CLOSE-UP GRASSHOPPER

Grasshopper sings to off-stage Kitten and Duckling with flourish and spirit.

Jumps for joy.

(CUT TO)

SCENE 4. LONG SHOT - GRASSHOPPER DUCKLING AND KITTEN

Duckling and Kitten look at Grasshopper who becomes subdued and serious as he laments in song.

Kitten and Duckling look sadly at each other.

(TRUCK DOWN TO)

SCENE 5. MEDIUM SHOT - DUCKLING & GRASSHOPPER AND HEAD OF KITTEN

Duckling sadly gulps, speaks, and then sheds a tear... wipes eye with wing

Grasshopper turns to Kitten..shakes his head in agreement with Duckling.

AUDIO

SONG - MUSIC

GRASSHOPPER SINGS:
(bouncing)

All I do....
...is have FUN..

SONG - MUSIC

GRASSHOPPER SINGS:
(the blues)

...But I'm hun-gry...
...some time..like now.

SAD MUSIC

DUCKLING:
(faltering speech)

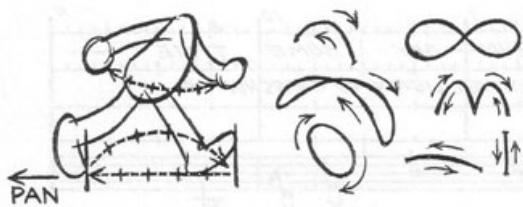
...An' I'm hungry...
right now..gulp..too..

I ran away from...
my MEAN step-mother...
...an' now...(sobs)

PRODUCTION #34 "LOST KITTEN" ANIMATOR SCENE 3 SHEET 1

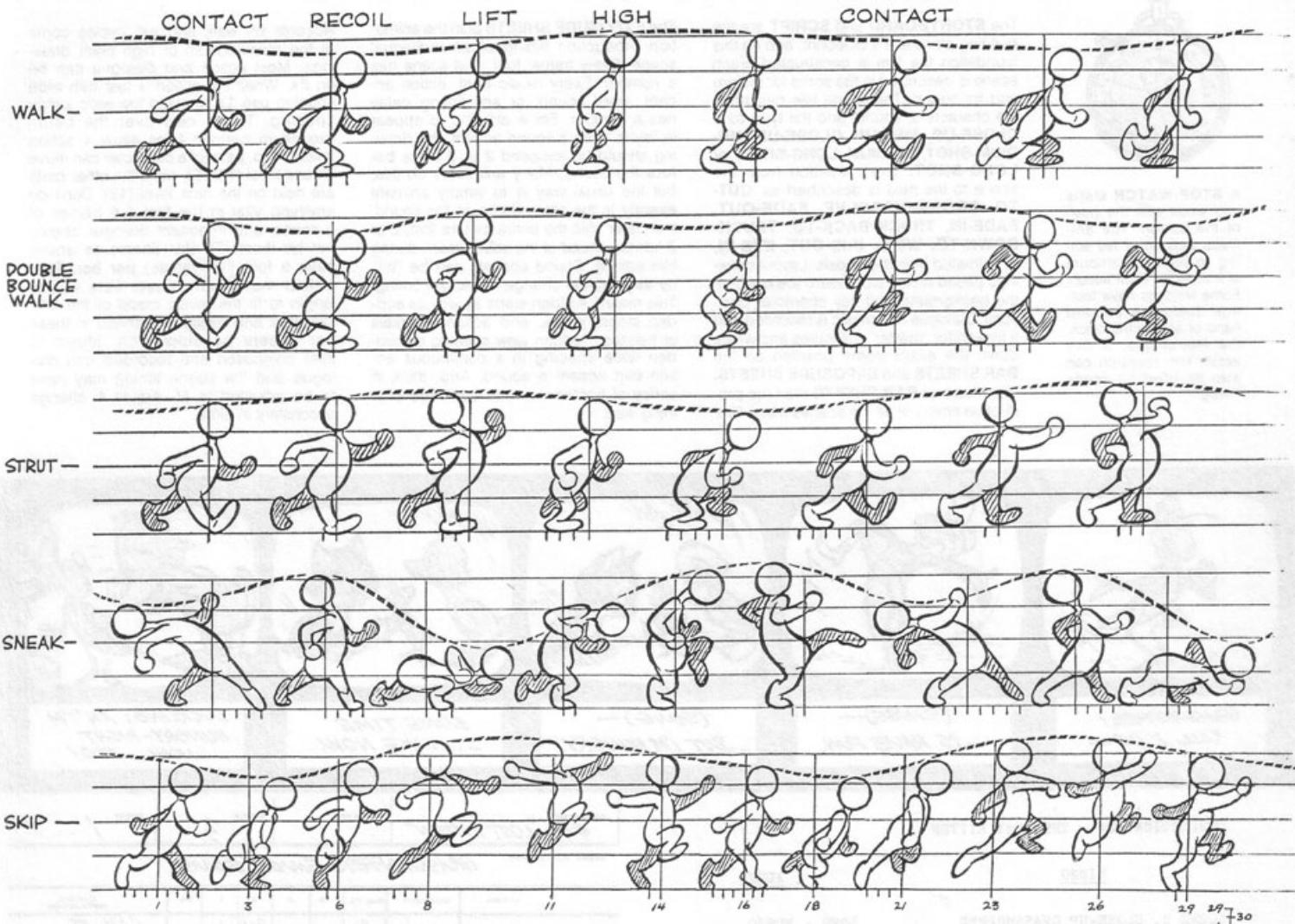
SCENE DESCRIPTION		GRASSHOPPER SINGS SONG						
ACTION	DIALOGUE	DIAL. NO.	4	3	2	1	BG	CAMERA INSTRUCTION
GRASSHOPPER RAISES HANDS		1	8					BLK 1
		2						CAM. AT 7 FIELD CENTER
		3						
		4						
		5						
		6						
		7						
		8						
		9						
INTO	*	90						
		1						
		2						
		3						
		4						
		5						
		6						
		7						
		8						
		9						
		10						
		11						
		12A						
		12B						
		13C						
		14						
		15						
		16						
		17						
		18						

CYCLES - PLANNED ANIMATION



These CYCLES are from my other Foster book, "Cartoon Animation," #26. On a pan scene, when the foot is placed on the ground it moves with the pan moves, as those indicated below. These moves are related below to a stationary center line. The body and all the parts move in paths of action; these are the usual patterns. The action can move in either direction. As in life, cycles have countless variations. Exaggerate or subdue any position or move.

Never move a character without acting meaning. Bring out a gesture, mannerism or story mood in every cycle. On page 30, two cycles below are combined in a double-bounce-strut. Notice the cocky gesture at high points. It is readable because it is a series of closely related drawings. Then no time is lost in going to opposite step gesture. Funny walks can "make" a film. Girls move with a distinctive arm-body mannerism (see page 39).



PLANNED ANIMATION is a system of combining animation methods and planning the re-use of this art work in many scenes. It is used to produce the considerable film footage of TV cartoon series. A change of pace results from the use of full animation in critical actions of the story, and the use of limited animation in dialogue with bursts of full animation for important gestures. Animation, backgrounds with overlay backgrounds, and camera fields and trucks are planned for use in many combinations. This production work thus gets much more "mileage." So, plan your film.

CYCLE ANIMATION as the above can be put on long cels that allow 12" on each side of the drawing. Such animation can be used as above in the field center with a moving pan as the background. The same cels placed on moving pegs can move the character through a still background scene. Or the same cels can walk into another background, stay centered as the background moves, and then move out when the background stops. And, on the three other cel levels in the animation scene, other cycle-characters can move at a different speed, in any direction; and plus camera moves.

LIMITED ANIMATION is based on dividing a character into as many as four cel levels; and a dialogue system as illustrated. It is especially adaptable to the type of character on the other page. The dialogue system often is more elaborate, as 7 heads up-down, and 7 heads in a sideways move, all around a centered head. Laughs and giggles are often animated by a laughing evenly-spaced up-down series of such heads in a stagger-timing on the exposure sheet. Dialogue head-series can be fitted to a body cycle walking on a pan background. A bottom peg camera device moves the pegs up-down to fit the walking action. (Note: body action peg-holes are adjusted.) Heads can fit characters in a vehicle on a pan; and, this entire action bounces on the rough road using the same device attached to the bottom peg bar. Such mechanics are endless.

ANIMATED CUT-OUTS can be added to full or limited animation cels. After the cel is placed on camera, the cutout is placed over or under the cel according to a few dot guides on cel. For example: An elaborate line-engraving of an antique auto is cutout and placed under a series of cels that animate the wheel action, dust, smoke, and characters seated in the auto.

LIMITED ANIMATION – CUTOUTS



TV LIMITED ANIMATION is based on dividing characters into parts that work on separate cel levels. Here are examples of the many divisions possible. The same set of character cels can be used in many scenes.



DIALOGUE SYSTEM The head moves in a slight nod action up and down in drawings 1 to 4. Each head has a series of 4 to 7 mouth drawings that work on the cel level above the head. Thus the head nods in many timings for any amount of dialogue.

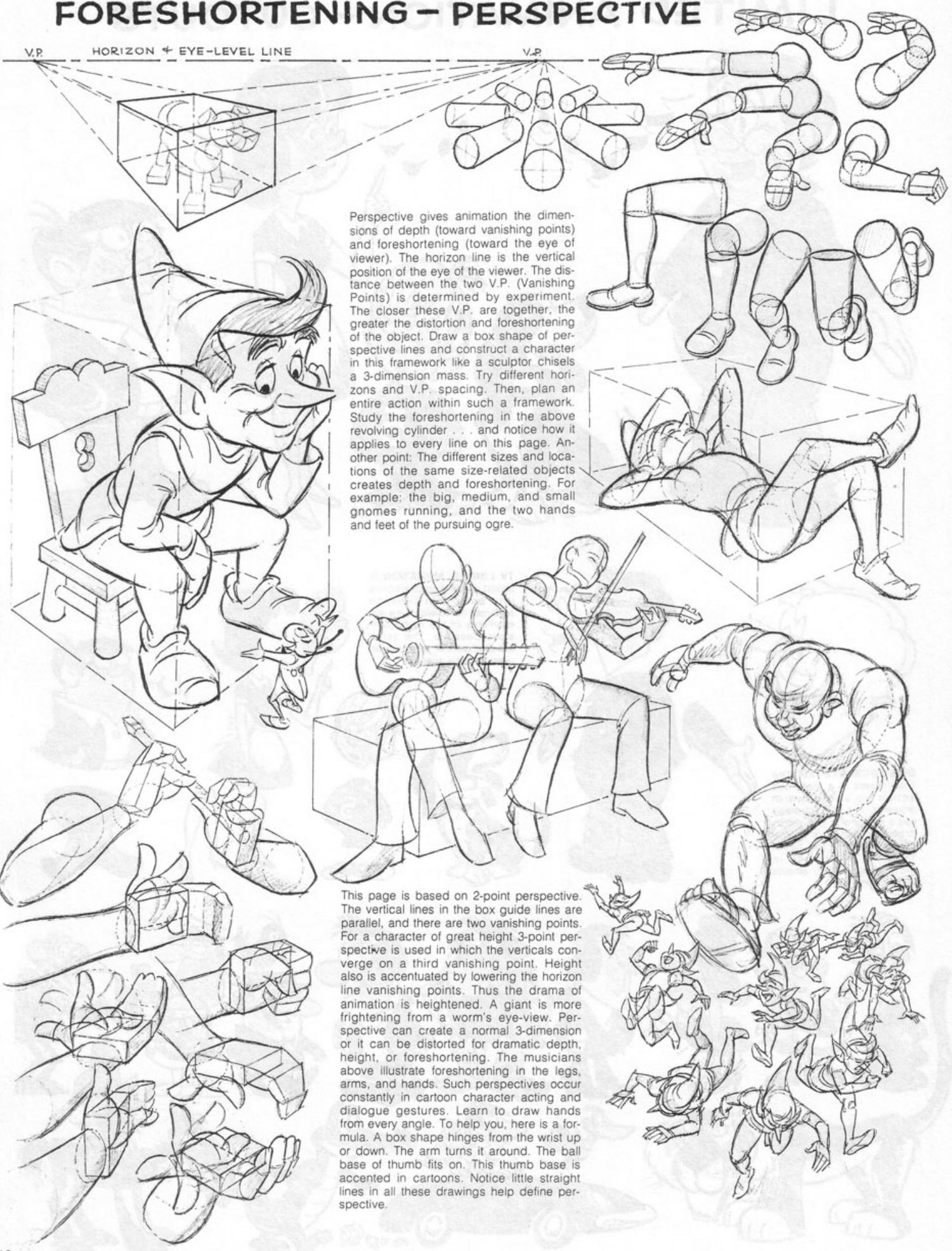


FORESHORTENING – PERSPECTIVE

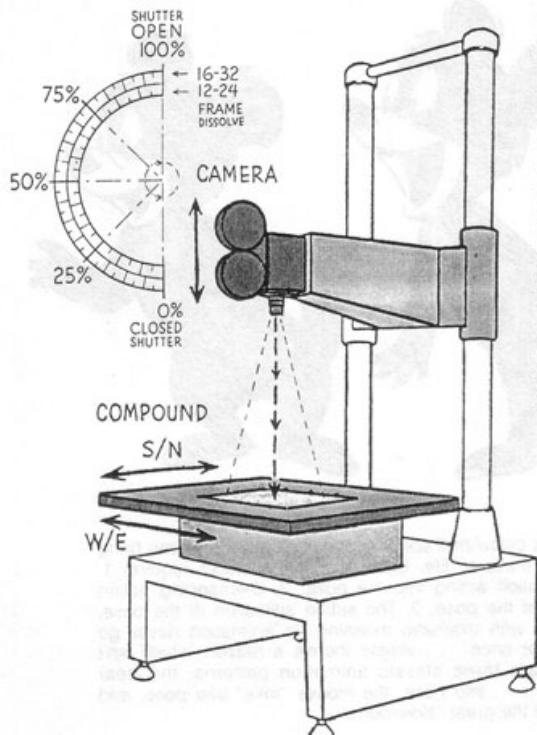
V.P.

HORIZON + EYE-LEVEL LINE

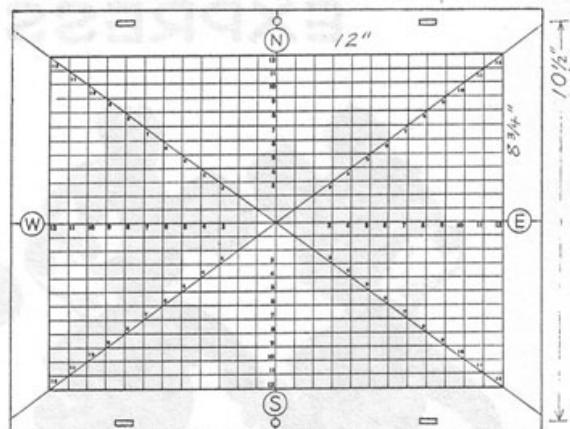
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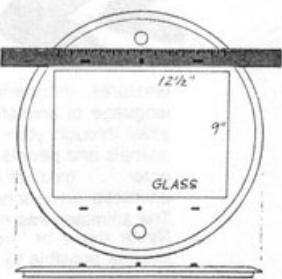
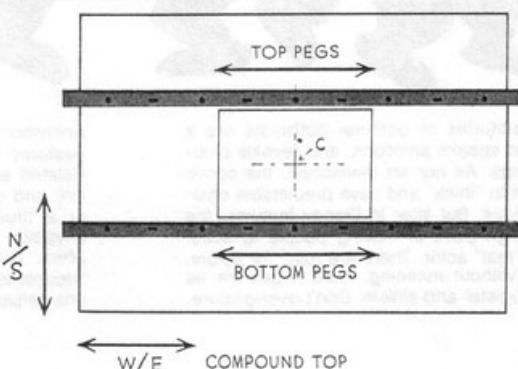
CAMERA & TECHNICAL



THE ANIMATION CAMERA moves vertically, up-down, centered in a fixed point. The artwork on the **COMPOUND** moves north-south N/S and west-east W/E. A camera "truck" is the vertical movement of the camera plus these compound adjustments needed. Compound moves alone are called "camera-moves." The camera trucks from a 3½ to 12 field according to chart at right. Fields are located by center of field like a map N/S W/E, and this measures compound moves. The **COMPOUND TOP** has top & bottom "peg-bars" that move right or left. These are called "pan" moves for a background and "peg" moves for "cel" animation artwork.



12" FIELD CHART



DRAWING DISC

2	I	DIAL	T	B	CAMERA INSTRUCTIONS
		1			
		2	TOP BOT.	5 FIELD	
		3	PEGS	1 1/2 S-3 E.	DISSOLVE- IN SCENE
		4			
		5			
		6	START BOT.		
		7	PEGS 4" LFT.		
		8	OF CENTER		
		9			
		0			
C-1		65	1		
		66	2		
		67	3		
		68	4		
		69	5		
		70	6		
		71	7	TRUCK CAMERA	
		72	8	FROM 5F-1 1/2 S-3 E.	
		73	9	TO 8F. CENTER	
		74	10		
		75	1		
		76	2	START PAN	
		77	3	+BOT. PEGS	
		78	4	RIGHT →	
		79	5		
		80	6		
BLK.	(1)	7	05, 10		↑
	2	8	05, 15		
	3	9	10, 20		
	4	20	10, 25		
	5	1	15, 30		
	6	2	1, 1		
	7	3			
	8	4			
	9	5	TRUCK		
	10	6			
	11	7			
	12	8			
	(1)	9			
	2	30			
	3	1			↓
	4	2	CAM. AT 8F. C.		
	5	3			
	6	4			
	7	5			
	8	6	STOP PAN		
	9	7	+BOT. PEGS		
	10	8	10, 20		
	11	9	05, 15		↓
	12	40	05, 10		
C-2	(3X)	1			
	14X	2			
	15X	3			
	16X	4			

Animation is drawn on 10½" X 14" paper and photographed on .005 acetate "cels."

These are punched with peg holes for registry. The pegs at top of page are widely used for TV series, commercials, and other production.

Most animators use the aluminum-cast drawing disc that fits and rotates in a circular hole cut in a drawing board or table. The above disc has an adjustable moving peg-bar that serves as top or bottom pegs by rotating the disc. Other discs have only the set pegs, or two moving peg-bars.

A 60 watt bulb or double fluorescent light is used in a light box under the disc. Never use a single fluorescent light as it is stroboscopic and not good for the eyes.

The 12 field (12" X 8¾") as charted above is the size and area of normal production. Only fields from a 3½ field to a 12 field are used. The location of the point-center of a field on the above chart is specified as either C. (for center) or the N/S and the W/E field distance from C. On the exposure sheet at left the start 5 field's center point is 1½ fields south of center and 3 fields east of center ... like a map.

Cameras truck to an 18 or 24 or as high as a 36 field. This is for special unusual art work that is rarely animated, usually still. Cameras have special equipment for fully animated cel production at an 18 field. Extra peg-bars are built into the compound. Many compounds have double top and bottom peg-bars to help with 12 field production.

Many compounds rotate 360°, a complete turn. Fields can tip to any angle, twirl around, or shift to a 90° vertical that would allow for an up-down pan scene. An 8¾ field is the largest that will fit sideways for such a pan. Tilted fields are indicated in degrees as surveyors indicate angles on a map. The versatile camera can do many things.

The cameraman "shoots" the scene based on the exposure sheet form and method at left. The animator draws a heavy line at the start and stop of all camera and peg-bar moves. A truck is indicated with a vertical arrow. A camera dissolve-out is a V, a dissolve-in is an inverted V as shown. These two V forms are combined in an X form for a fade-in and fade-out dissolve, and they overlap in an XX shape for a cross-dissolve.

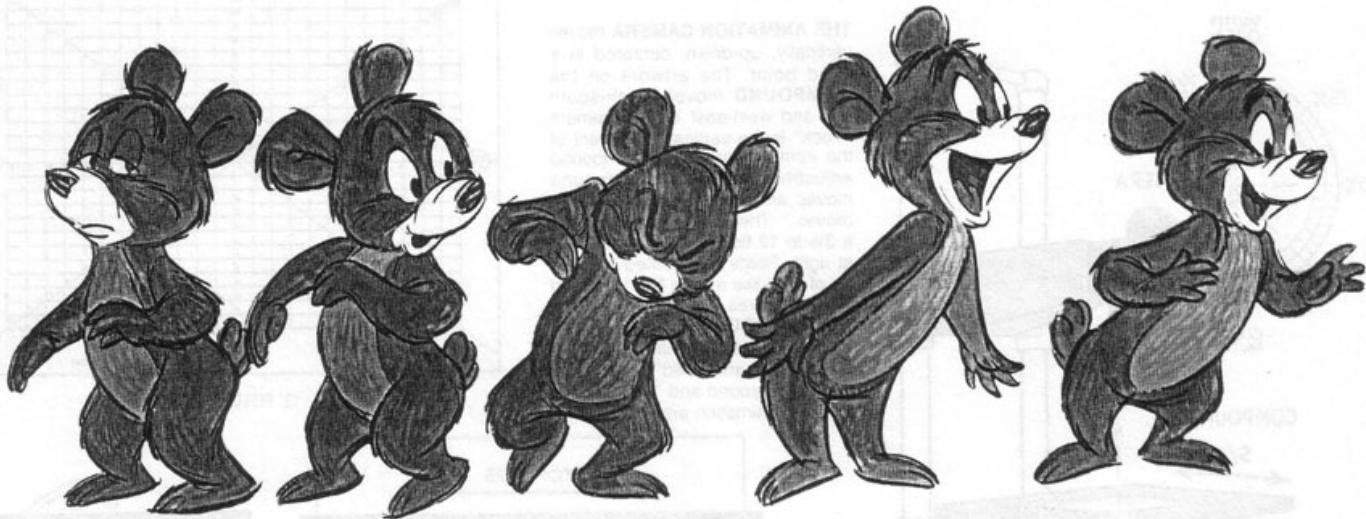
Compound peg-bar cel or pan moves are given in decimals, however, pan moves are also given with a chart of moves above or below pegs on the edge of background.

When a held cel is removed resulting in no cel position in column, a blank cel is placed. There are four cel levels. Sheets are usually for 80 frames or 5 feet. Also see page 9. A scene is easier to "shoot" if the pan is on the top pegs and the cels are on bottom pegs. Animation drawn on the "natural" top pegs can easily be put on bottom peg cels.

The camera runs backwards and forwards and can shoot a scene in either direction. Thus a scene exposed beginning at the end and moving towards the start enables a piece of artwork or an animated cycle to be "scratched-off" or cut-off according to planned spacing. When projected forwards the action is growth.

An opaque painted shadow, cloud, water-cycle, rainbow, or ghost animation becomes transparent to a specific degree by making one run of the scene at a 50% (or other) shutter stop, then, a second run **without** artwork to be transparent at a 50% (or other) shutter stop. The total exposure of both runs must be 100%. Or, a character appears to walk through an opaque rainbow, tree, cloud, door, or water cycle by making two 50% runs with the character above and then under these artworks. A "matte" shot uses a black matte over a scene being photographed, thus the area of the "matte" is unexposed. In another run a character is exposed in this exact area.

EXPRESSING AN ATTITUDE

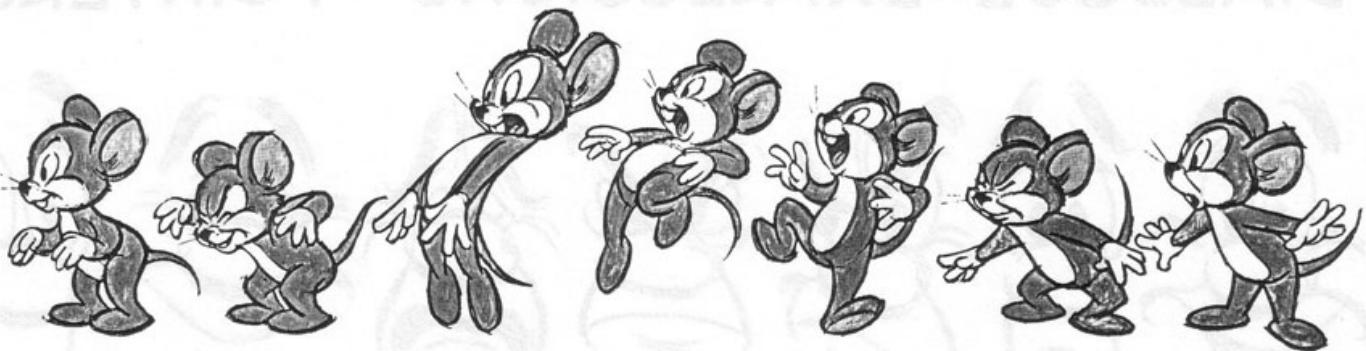


Gestures, mannerisms, attitudes of posture, outbursts are a language of animation that speaks emotions, and reveals character through your drawings. As our art developed, the comic animals and people began to "think" and have predictable character . . . most of it hilarious. But later in Disney features, the animated art reached a high point of moving people to tears. The animator was now a "real" actor. There are rules for actors. Never move or "freeze" without meaning. Hold a gesture as long as possible to let it register and sink-in. Don't over-gesture.

Animation is a calculated spacing of cartoons . . . that can bring gestures like these to life. Each of these gestures require: 1. Related animation acting into the pose. 2. Overlapping action into and out of the pose. 3. The subtle animation of the pose, or a "freeze" with dramatic meaning. In animation never go anywhere all at once . . . unless there's a reason, which isn't often. Here are three classic animation patterns, the bear "double-take" . . . into pose, the mouse "take" into pose, and one version of the great "slow-burn."



EMOTION - GESTURE - REACTING



Start with the emotion, get inside the character and act it out, and then sketch the sweep of the body-arms-legs-head. Explore every tilt and turn of the head . . . and the expressive hands. Make everything work for you . . . ears . . . tail . . . hair . . . legs-feet . . . clothing, etc. For the action make a few thumbnail sketches, and a little script. For example: Dog (with red hat) sneaks-in, stops in forward crouch, big eyes look side-to-side, raises body erect, hand follows thru slowly to lips (show conspiracy), into pose slowly, ears and tail overlap in pose.

In the "take" of mouse above he sinks into an anticipation crouch or contraction that is always brief, then springs into the stretch expansion (also brief), then in a scramble he reverts to normal size look. This reaction has wide use in animation in many forms. It can be reversed with stretch first, then crouch contraction, then into look.

Actions have drawings like bear #2, slow-burn #2, that need to be prolonged with close adjacent drawings, or held. The bear could blink, and #2 of burn could move back further slowly.



DIALOGUE EXPRESSIONS – POINTERS



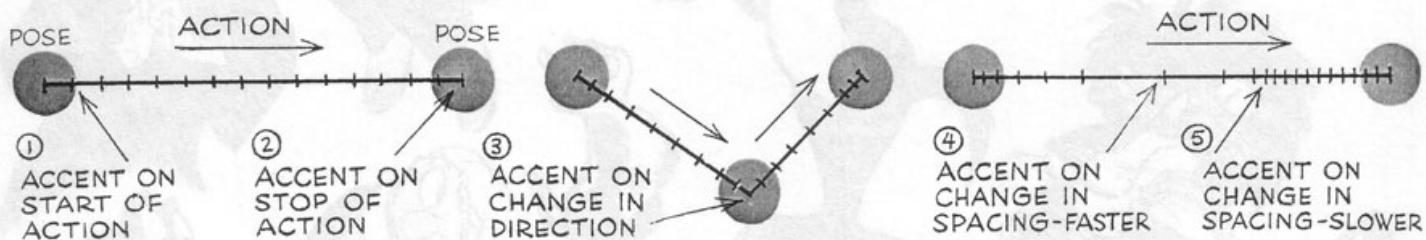
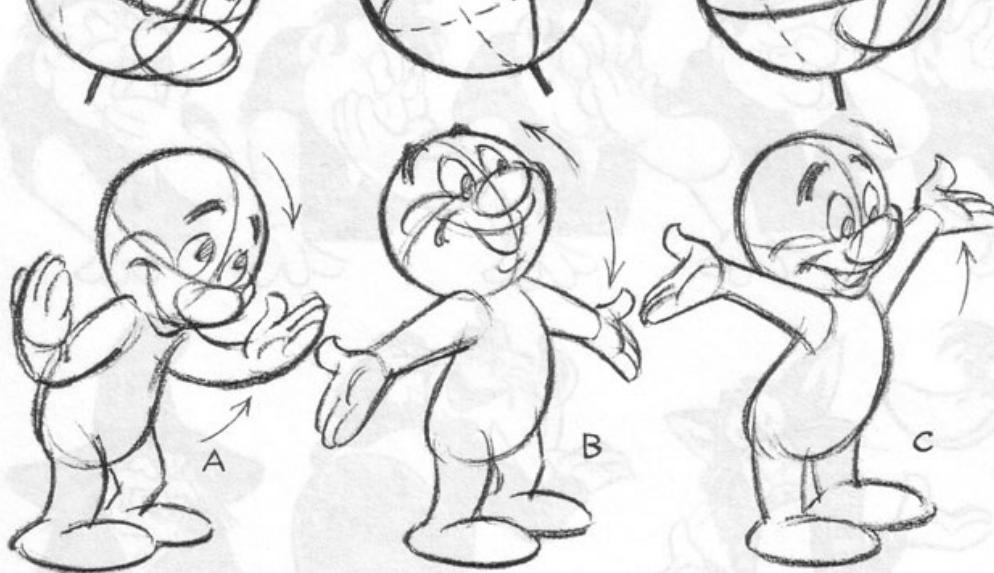
An actor-animator has an enormous range of expressions that move on his face, and he studies these in a mirror on his desk.

Every expression is based on four factors, the eyebrows, the eyes, the eyelids, and the mouth-cheek area. All of these affect the expression, and you have to get each, and all of them working together.

Many expressions are not symmetrical . . . both sides are not the same . . . and they don't have to be. A symmetrical expression can change in your animation to a non-symmetrical look with dramatic effect.

The animation principle of contraction to expansion to normal, or expansion to contraction to normal is very important in facial action . . . and effect. And overlapping action of the four factors can improve many actions. For example: an eye blinks (contracts), opens wide (expands) and then goes into normal pose, followed in an overlapping action by the eyebrows and then the mouth-cheek expressions. The face is a continuous overlapping action of contraction and expansion.

Make a cassette or tape recording of the dialogue to play and study when animating. Then, mouth and act-out each phrase and sentence many times before drawing the act.



The tilt-angle at which the head is held, where the character is looking, and the movement of the head in relation to the body creates an expression as well as the facial features.

The simple tilting of the head into a posture related to the facial expression can convey a broader emotional range.

An example is TV hand-puppets that operate on a tilt and body twist alone without the benefit of accurate phonetic mouthing or any facial action whatsoever to convey many emotions. Acting a hand puppet is excellent dialogue research for an animator, as you learn how just a five degree change in tilt can convey a different emotion.

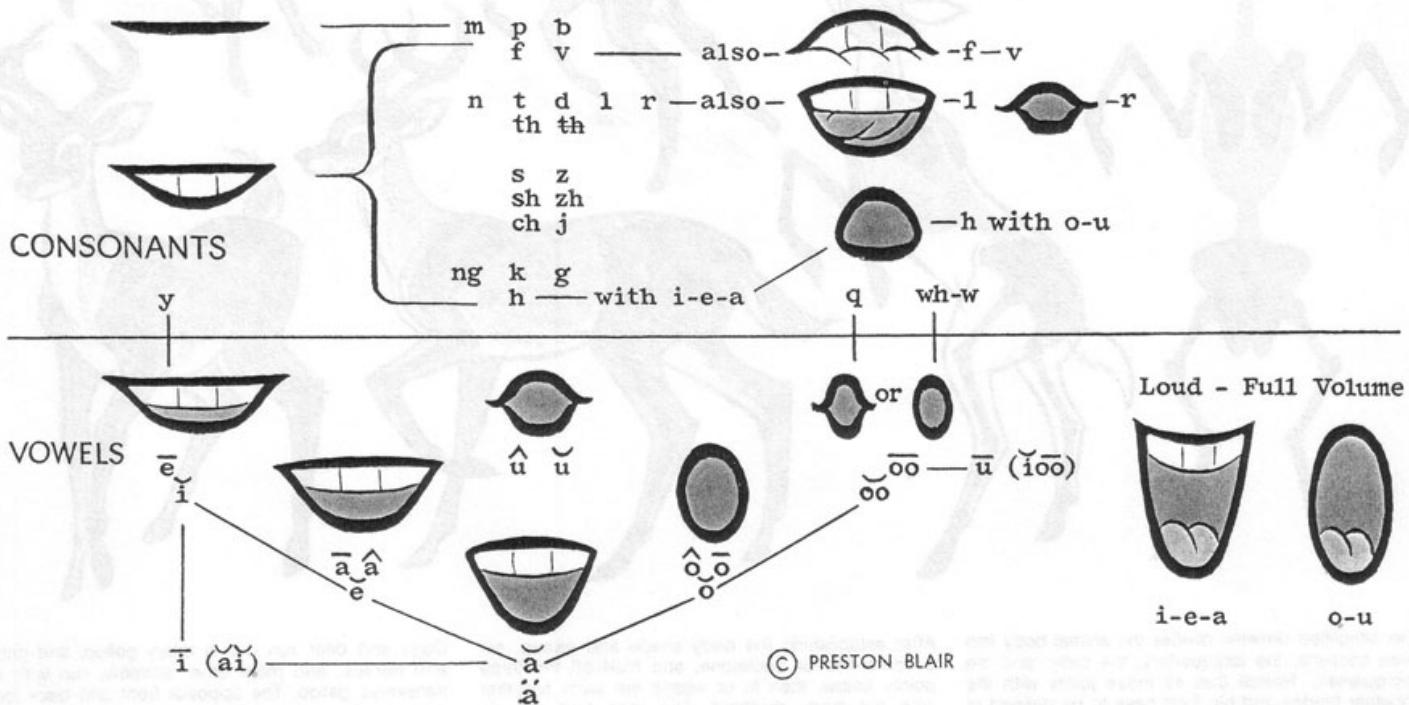
Many tilts or head turns are gestures in the action, as a nod is for affirmative dialogue, and a shake sideways is for negative doom. A certain jerk points to another character, etc.

An accent in dialogue action can occur at an action start or stop, any change in spacing, and any change in direction.

Accent the start of phrases of dialogue as well as the loud sounds in the track. Divide the dialogue into phrases of action and expression. Remember, however, that often one facial expression should dominate an entire scene to effectively advance the plot, and say more than the mere words.

As shown above, when the hands and arms gesture the dialogue, the head tilts to balance these moves in the opposite direction. This results in an overlapping action and follow-through that can improve many dialogue actions. The action above could be saying the dialogue on the opposite page. You fit it. A to B is "All of the boys," and B to C is "caught a fish." B is a pose accent for "boys," and C and spacing accents "fish."

MOUTH ACTION – PRONUNCIATION



Webster Pronunciation Symbols -

ō1 äv thĕ boîz k ô t ā fîsh

English -

All of the boys caught a fish.

Animated Mouth Arrangement -

uth Arrangement - **th** **k**
ô-1-ä-v-ě-b-o-iz-ôăěif/ěish
Inhetween drawing. Jump in size.

The animator creates an illusion of speech . . . or an image based on reality that is believable. Real mouth action is analyzed by phonetic science and the pronunciation alphabet guide after every word in the dictionary. And, your own mouth action analyzes.

When you pronounce "all of . . ." your mouth shapes the sounds of *av* . . . The *a* in *all* is like *b-ough-t* or like *c-ough-t* . . . or an *o*. While the *o* in *of* is an Italian a like *f-a-r*, *f-a-ther*. English is irregular.

A famous example is f-i-sh. These language sounds are actually spelled "ghoti" in the sentence: "There's enou-gh w-a-ter in this po-tay-to".

In the phonetic chart above, the Italian a is formed at the bottom middle of the mouth, the i at the front-top, and the oo at the back-top. These are the vowel extremes. Consonants are formed at the extremes of the mouth and the extremes of the tongue.

The phonetic *i* is really two sounds blended, *a* + *i*. And likewise *u* is *i* + *oo*. Mouth it. The word "f-ew" very ac-

Actually analyzes the sound u for animators.
Americans mouth r as u. A Scotch r is like n-t-d.

Phonetic science every animator should know is

n-ŋ are nasals and sound comes at this mouth, but p(unvoiced) and b(voiced) are explosions of m and the sound is **after** this mouth. And, t-d are explosions of n, and k-g are explosions of ng(a sound without a letter).

The dialogue is entered on the exposure sheet by the track-reader. The sound and volume of each frame is indicated. The mouths on the exposure sheet here are a guide and are not usually put on the sheets.

Mouths fit the character and mood. Often a cartoon mumbles out of the corner of his mouth, and all the dialogue is a slight variation of a gesture mouth.

Study your mouth action in a mirror . . . the general flow of shapes through a sentence. Your mouth blends and consolidates vowels and consonants in a continuous movement. The faster the speech, the more blending . . . until an entire sentence is mouthed as just one word.

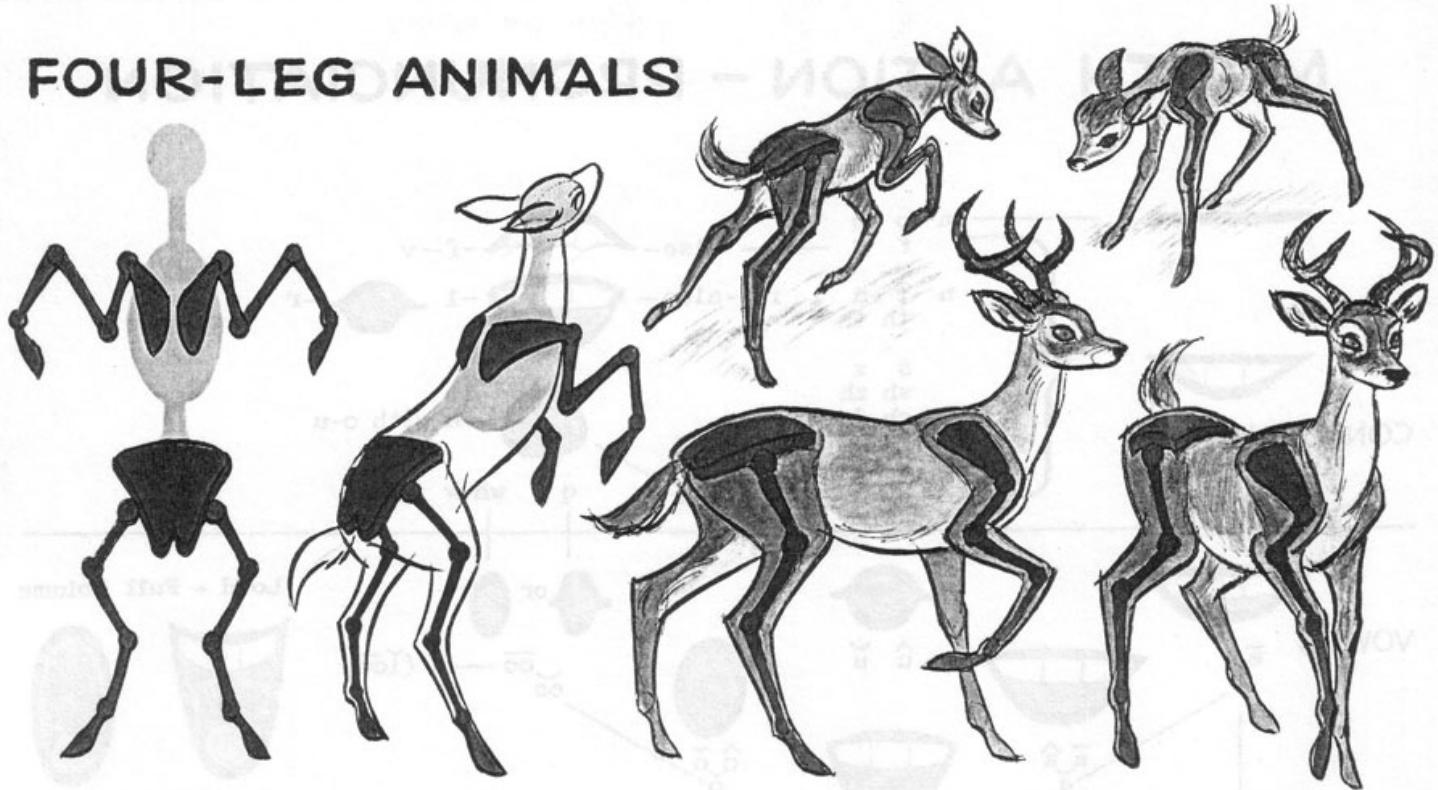
There is simply a speed limit. Animation that passes this limit chatters unrealistically, destroying the illusion. This is caused by too many jumps from side to side in the above path. Don't get jumps to close together, or too many together in the exposure timing. And, get jumps before vowels when the mouth opens.

Important vowels are treated like a pose with plenty of drawings to make them register.

Many mouths in your action can be influenced or modified in shape to fit adjoining mouths, and thus a smoother action results. Many characters cannot pronounce words with all these positions on the chart (like f-1), and many gestures limit mouth shapes. Just draw in the direction of the right mouth (blend).

DIALOGUE	DIAL	5	4
—	1	1	
—	2	2	
—	3	3	
—	4	2	
—	5		
—	6	3	
—	7		
—	8	4	
—	9		
—	0	5	
—	1		
—	2	6	
—	3		
—	4	7	
—	5		
—	6	8	
—	7		
—	8	9	
—	9		
—	0	10	
—	1		
—	2	11	
—	3		
—	4	12	
—	5		
—	6	13	
—	7		
—	8	14	
—	9		
—	0	15	
—	1		
—	2	16	
—	3		
—	4	17	
—	5		
—	6	18	
—	7		
—	8	19	
—	9		
—	0	20	
—	1		
—	2	21	
—	3		
—	4	22	
—	5		
—	6	23	
—	7		
—	8	24	
—	9		
—	0	25	
—	1		
—	2		
—	3		

FOUR-LEG ANIMALS

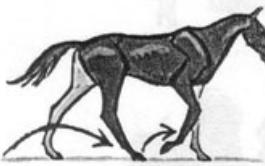
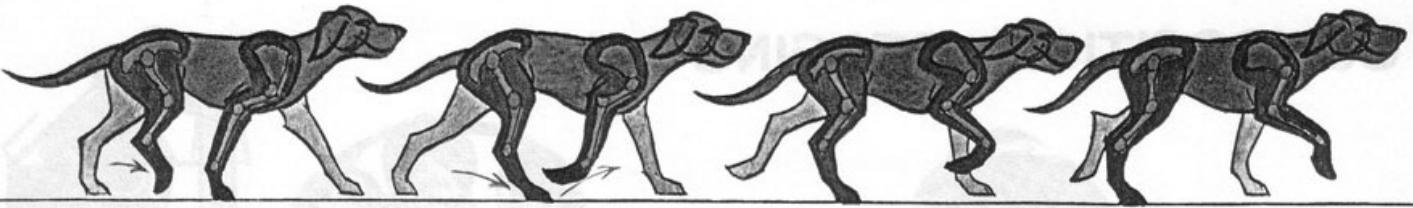


This simplified skeleton divides the animal body into three sections, the forequarters, the belly, and the rearquarters. Notice that all these joints with the shoulder blades and hip form have to be defined or suggested in your drawing. After first locating these pivot points then proceed with your drawing. Make legs irregular, not too parallel.

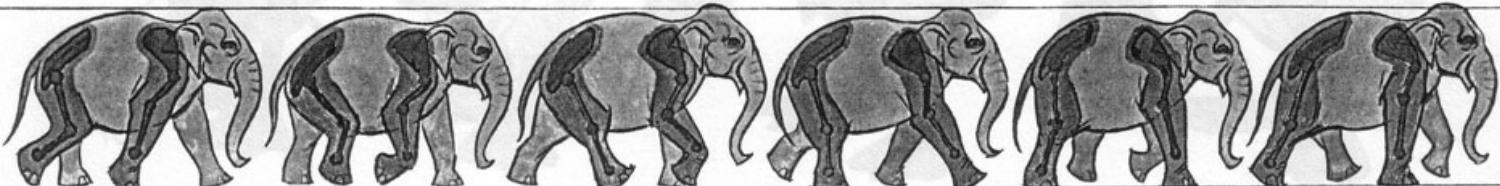
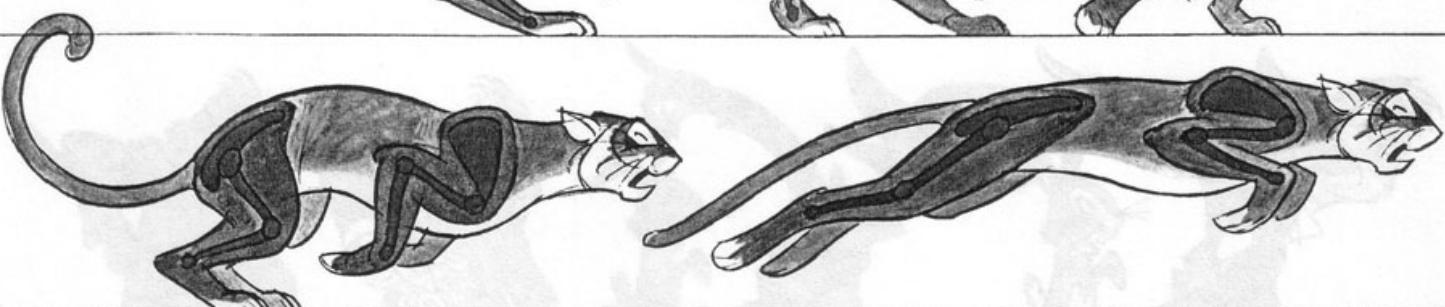
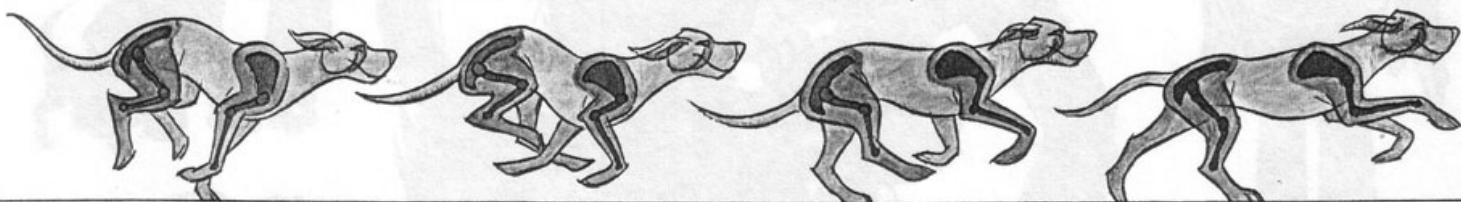
After establishing the body shape and sweep, set a center-line or backbone, and mark-off the three points below, then fit or weave the parts together with the body rhythms. The legs fold-up and stretch-out with the body all based on the action of the pivot points in paths of action. Characters with these anatomical elements can seem "real."

Dogs and deer run with a rotary gallop, and cats and horses, and most other animals, run with a transverse gallop. The opposite front and back leg leads in dog-deer runs. The same front and back leg leads with horses and cats. In any run the left or right front leg can lead, so, there are two versions of every animal run in this book . . . just reverse legs.





A walk cycle is two steps. In animal walks, the back legs are usually 1/2 step ahead of the front legs — as with the horse (and pup on page 39). The dog's back feet are 3/4 step ahead here, but could be 1/2 step. Elephant back feet are 1/3 step ahead here, but 1/2 step ahead in the amble-walk, which is their fastest. (Elephants can't run.)



COMPOSITION - STAGING



ARRANGEMENT FOR DRAMA

The **drama** portrayed by the **composition** first catches the eye—then, the composition directs the eye to the **center of interest** by various devices. The characters as above may bend toward and look at it. The abstract design may: point at it, intersect it, frame it, circle it, or bend around it just as parenthesis () do. It is accented by color difference, contrast, or tone. It is clear of detracting detail (see duck), and isolated. It may balance the composition in importance.

Compositions can balance like a scale with equal weights (areas), or as a balance of interest. A small object of importance, and isolated, can balance a huge object.

Characters are fitted and woven together in a group, with rhythm lines and straight lines that align, and areas that fit in patterns.

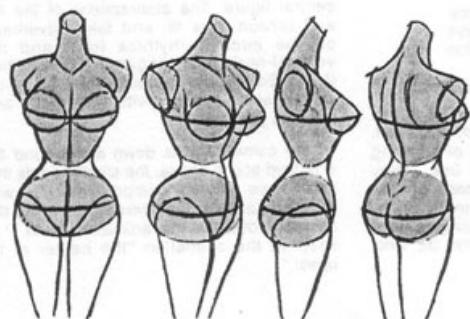
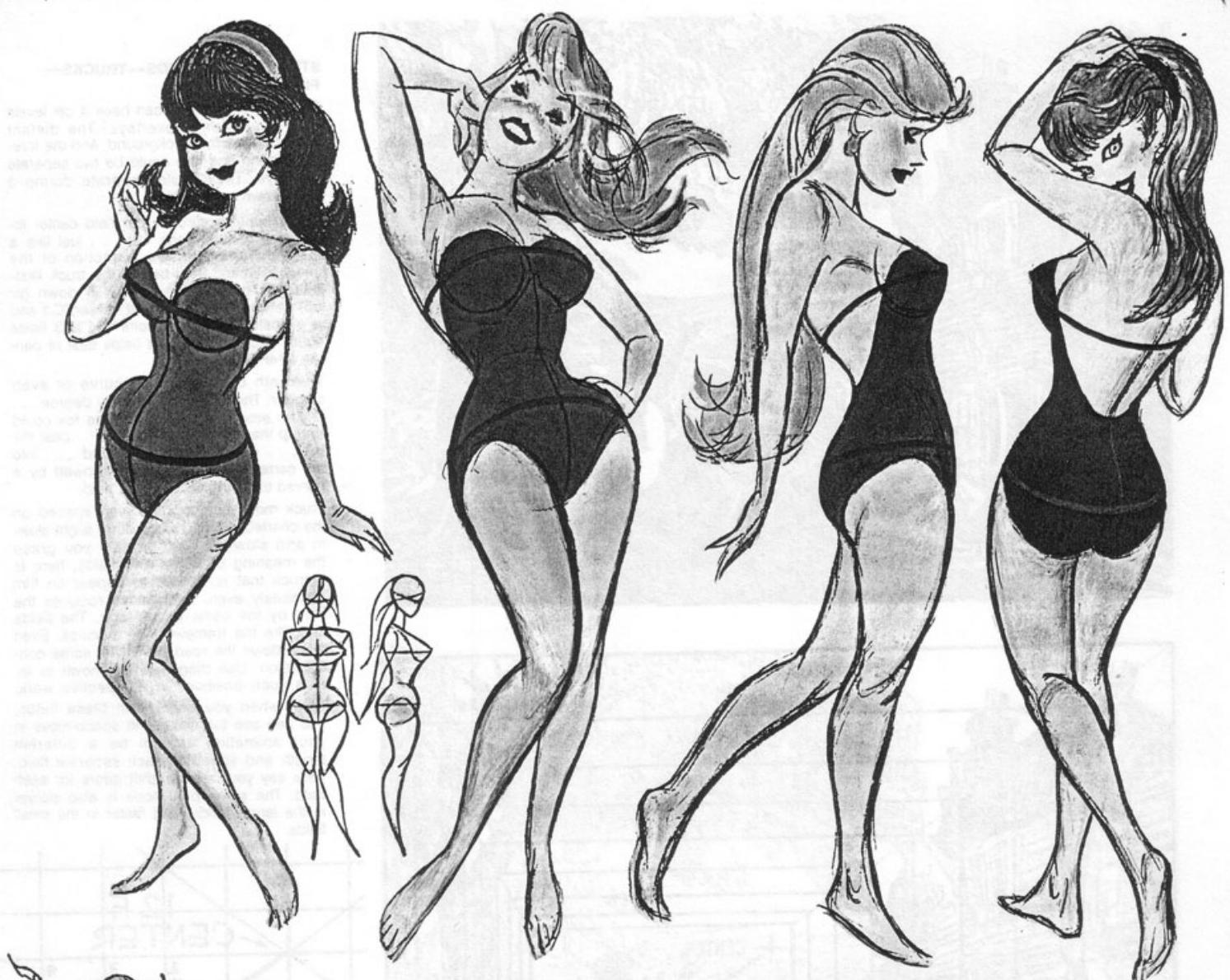
The alignment of character abstract lines creates circular and curved rhythm lines and the horizontals, verticals and diagonals.

The viewer's eye level is important when he looks at grandeur or big monsters from a worm's eye view—or down at small things all.

Appreciate the **value of silhouettes** to define and clearly tell the story in two dimensions. Even in groups they define all alone (above).

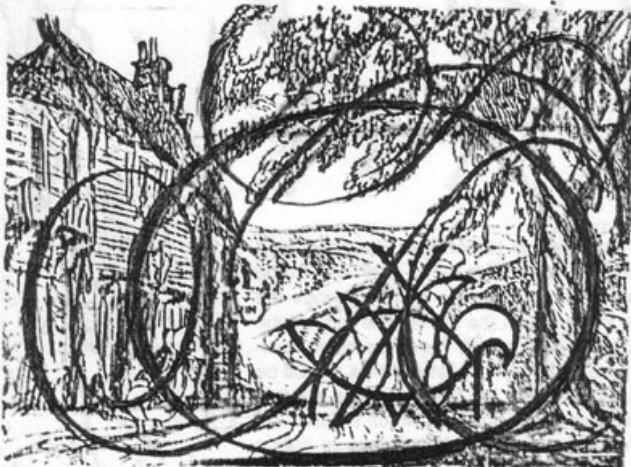
Of course, there's a time and place for three dimension foreshortening and perspective to give reality. Then, you have to define with uncluttered, simple, good drawing (a big order).





GIRLS move in a distinctive manner due to balance. The knees and elbows tend toward inward arcs in action. Typical is a throw with the elbow in, and almost a push in the release. An athlete swings the elbow wide in a whip release throw. When the leg lifts the foot off the ground, the hips tip as this support is removed, causing a chain reaction in balance in the entire figure (right). The chest and hips should be animated with perspective guides, just like the head. All three are in a constant state of tipping in balance (see page 39). At left is torso formula. The rhythm sweeps (above) are of vital importance to create grace and beauty.





COMPOSITION OF PICTURES

Under the realistic surface of every picture are abstract principles of composition that are the structure and the foundation on which the picture is built, that are the decorative pattern of the picture, and that are the means of telling a story or expressing a dramatic mood. Thus composition has a triple function.

The abstract principles are:

1. The varied principles of balance
2. The entrance and exit of the eye
3. Circular and rhythm composition
4. Angular composition
5. Units-groups—the figure in landscape
6. Light, shade, and color

Artists operate intuitively with composition. Many draw without the power of knowing composition principles they use. They draw without recourse to inference or reasoning, and with a kind of innate or instinctive knowledge of composition. Thus was Michelangelo, Leonardo da Vinci composed with knowledge.

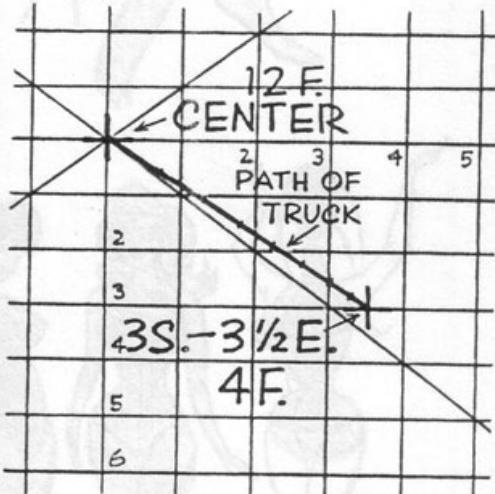
STILL BACKGROUNDS—TRUCKS—FIELDS

This #12 field scene can have 4 cel levels and a number of overlays. The distant hills could be the background, and the foreground inn and tree could be two separate overlays. They could separate during a truck-down to give depth.

A truck is indicated as per field center location on chart (page 13) . . . just like a map n/s and w/e. On a section of the chart at actual size below, the truck illustrated is charted. This truck is down (or up) between a #12 field at center (C.) and a #4 field at a center point that is 3 fields south of center, and 3½ fields east of center. (#4.3 S.-3½ E.)

The path of a truck can curve or even stagger. The field can tip to any degree . . . or turn around. In this scene the fox could run up the road . . . up the hill . . . past the inn . . . and into the foreground . . . into the camera . . . or reverse, followed by a curved truck from a 3½ to 12 field. .

Truck moves are usually even spaced on the charted path (in red), with a slight slow-in and slow-out. But, to help you grasp the meaning of trucks and fields, here is a truck that is figured to appear on film absolutely even. Each move reduces the field by the same percentage. The fields look like the framework of a house. Even steps down the road are in the same configuration. Use diagonals as shown to locate such positions in perspective work. Now, when you animate in these fields, you can see that the same space-move in your animation art will be a different length and speed in each separate field. Let's say you have to shift gears for each field. The same pan move is also slower in the larger fields, and faster in the small fields.



THE CENTER OF INTEREST

An understanding of composition principles is highly useful, even necessary to an animator when he moves and poses the actors in the stage set. The animation is the center of interest in the total picture. In all art there are abstract elements that support and point to this center. A classic example is Leonardo's "Last Supper" with all the diagonals leading the eye to the central figure. The abstractions of the fox and raccoon here fit, and take advantage of, the circular rhythms (red) and the vertical-horizontal-diagonal composition (blue). So, watch the perspective in the set as the actor moves (with meaning), and "play all your cards."

As the camera trucks down and around the #12 field scene above, the smaller fields that result have different compositions . . . with different abstract patterns . . . and the animator designs the animation to fit . . . keeping the animation "the center of interest."

PAN BACKGROUNDS — OVERLAYS — CELS — XEROX

The bear and raccoon in a walk cycle animate through scene to left. The pan background (top) moves to right under bear-raccoon long cels. Above these cels an overlay background of the large tree moves right at twice the speed or spacing of the pan background. Above the tree overlay, a second overlay background moves right at three times the speed of the pan. Thus the scene is given an illusion of great depth and distance. The variations in pan overlay speeds are based on actual perspective moves.

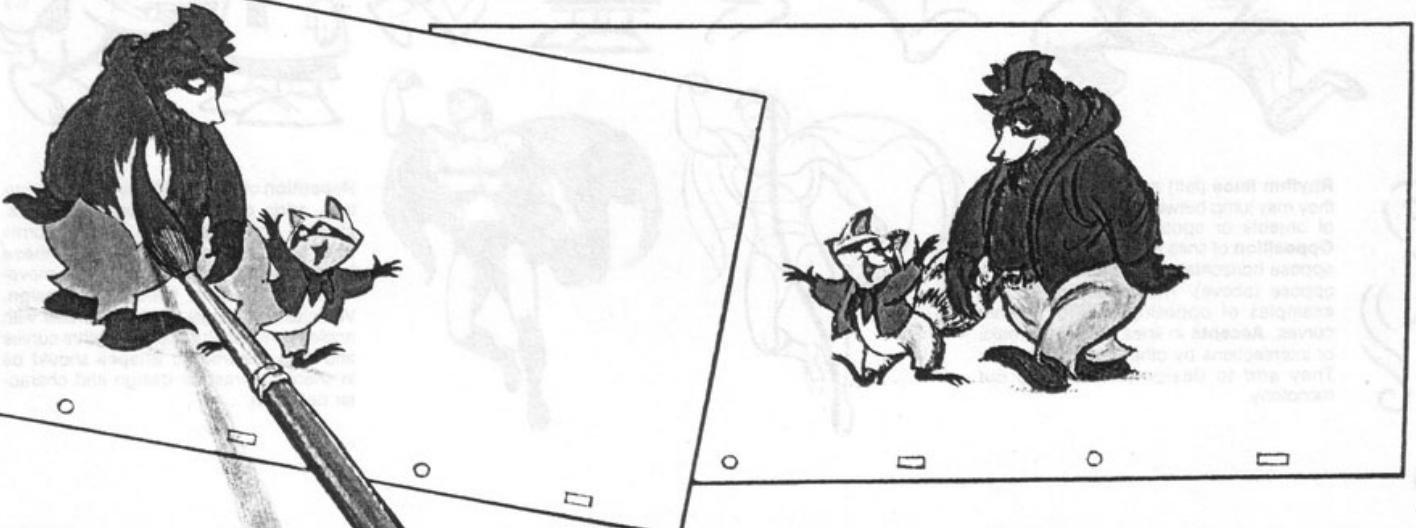
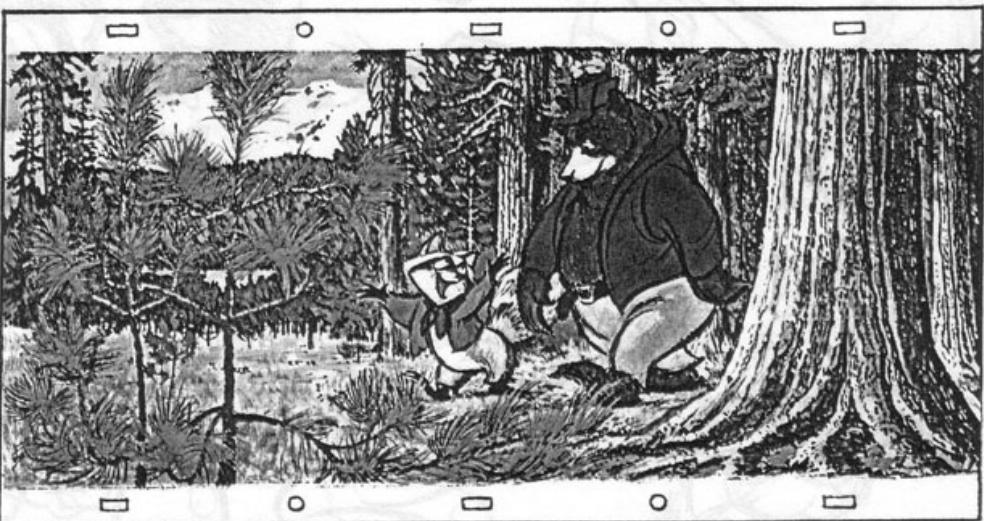
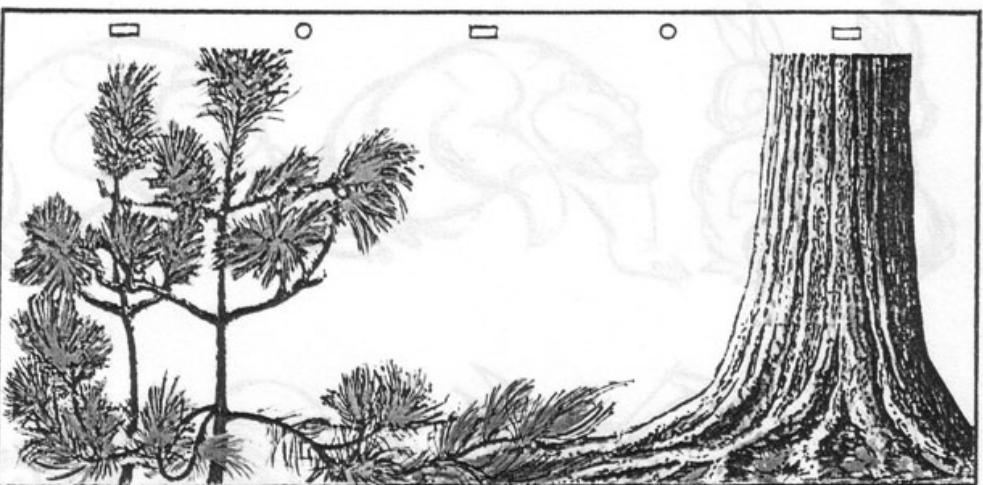
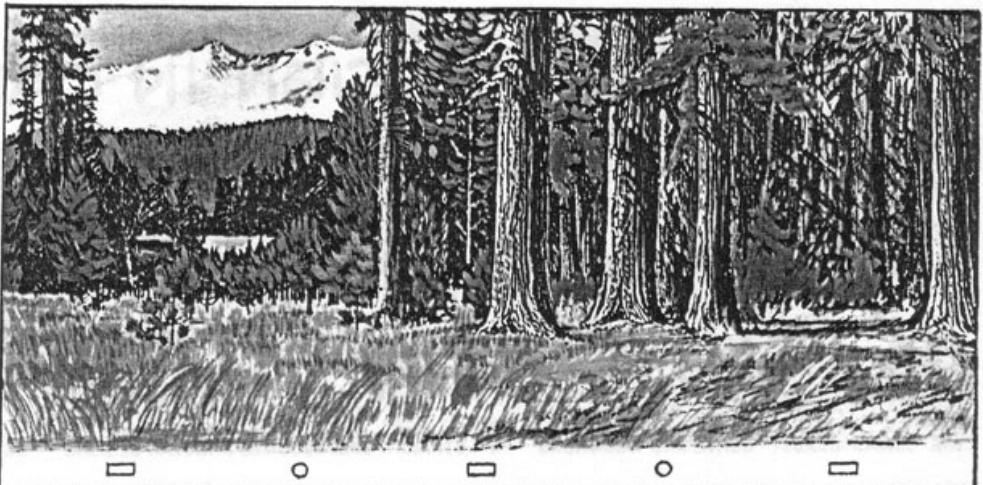
Backgrounds can be several fields in length. Or, a cycle background is planned with three or more fields like the first and last field painted exactly alike . . . thus the background can be jumped between these fields in a cycle.

Cycles like this bear and raccoon that move through a scene are on long cels that allow a full clear field (not indicated) on each side of the characters. If a drawing is used in only one peg position, it is usually put on a single field cel.

In TV planned animation many scenes are made from this artwork. Other pans are shot at smaller fields. Still scenes are made from sections of the background . . . with other overlays. Other animation is used. The bear and raccoon cycle walk through other backgrounds.

Overlays are cutouts, or the paintings are made directly on the cel with vinyl-acrylic paint. This water-based paint adheres to acetate, and is used in all animation cel production . . . and in artwork. As shown below the back of the animation cel is painted with this opaque paint. Originally the drawings were traced with pen or brush on the front of the cel with acetate inks . . . and many films are still made this way.

Xerox equipment is used to transfer most animation art to cels using fumes instead of heat to fix the image on the cel. Two types of Xerox are used, and the animator should know what each offers . . . as he should know what the animation camera can do. (1) The original Xerox hand-operated bellows camera offers both enlargement and reduction. It is used for both cels and backgrounds. (2) The Xerox 35mm Microfilm Unit is fitted with 35mm projector mechanism. The drawings are photographed on film by an animation camera, and this film is used to mass-produce cels. Thus the rotoscope is obsolete. Trucks and all operations of an animation camera can be done by this versatile xerox.



RHYTHM + DESIGN IN CARTOON ART

Here is the secret formula behind the appeal and charm of great cartoon art. Every artist has instincts and intuition that tell him these things. Here is the abstract design basis to help you.

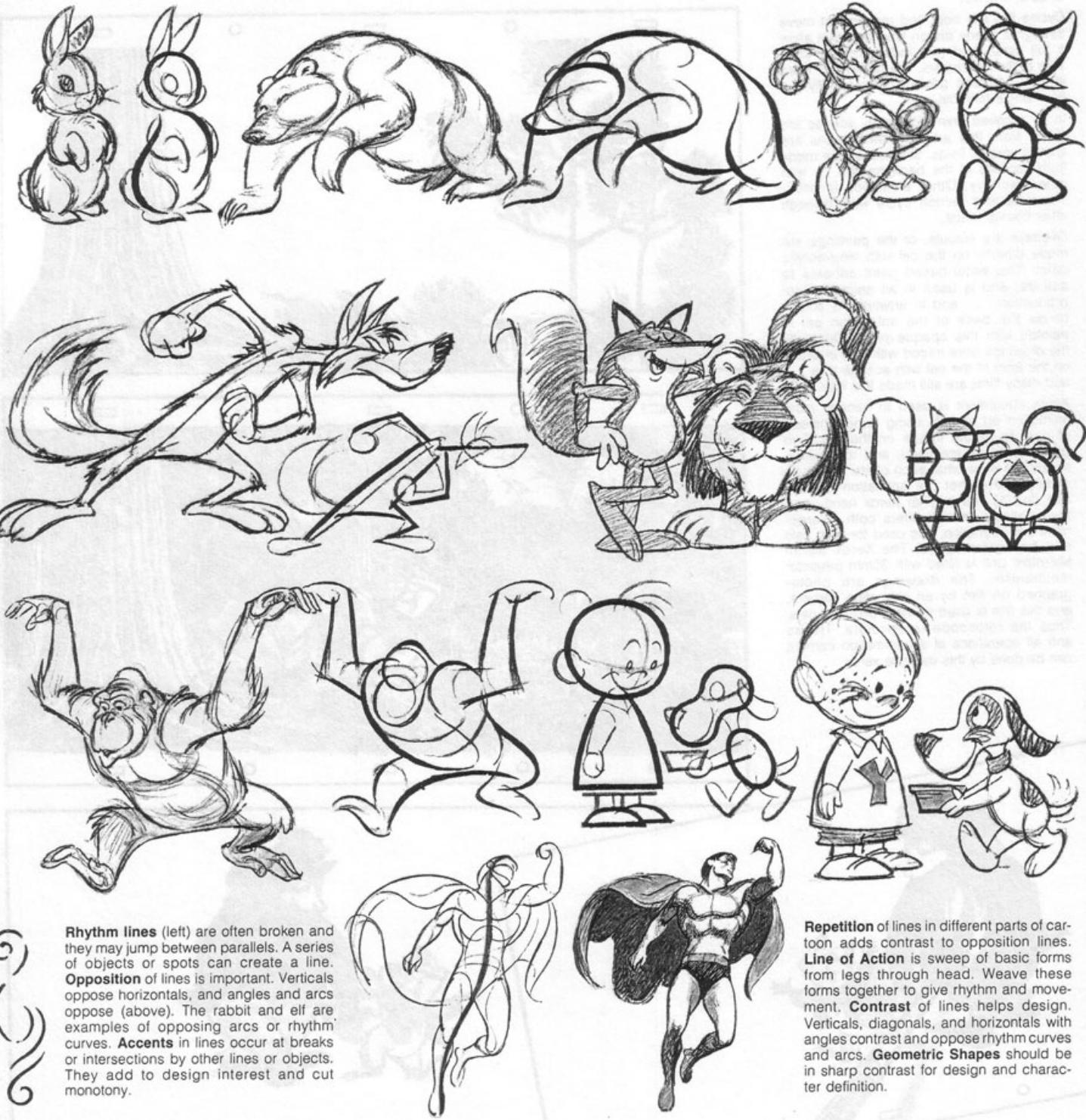
The basic "S" curve of rhythm, and the opposite arcs (next) have great value for your drawings. Learn all their values . . . like "the value of a straight line" . . . many drawings fail without it.



THE "LINE-OF-BEAUTY" CURVE AND VARIATIONS

THE STRAIGHT LINE BECOMES ANGULAR DESIGNS

GEOMETRIC SHAPES ARE BASIS OF MANY CARTOONS



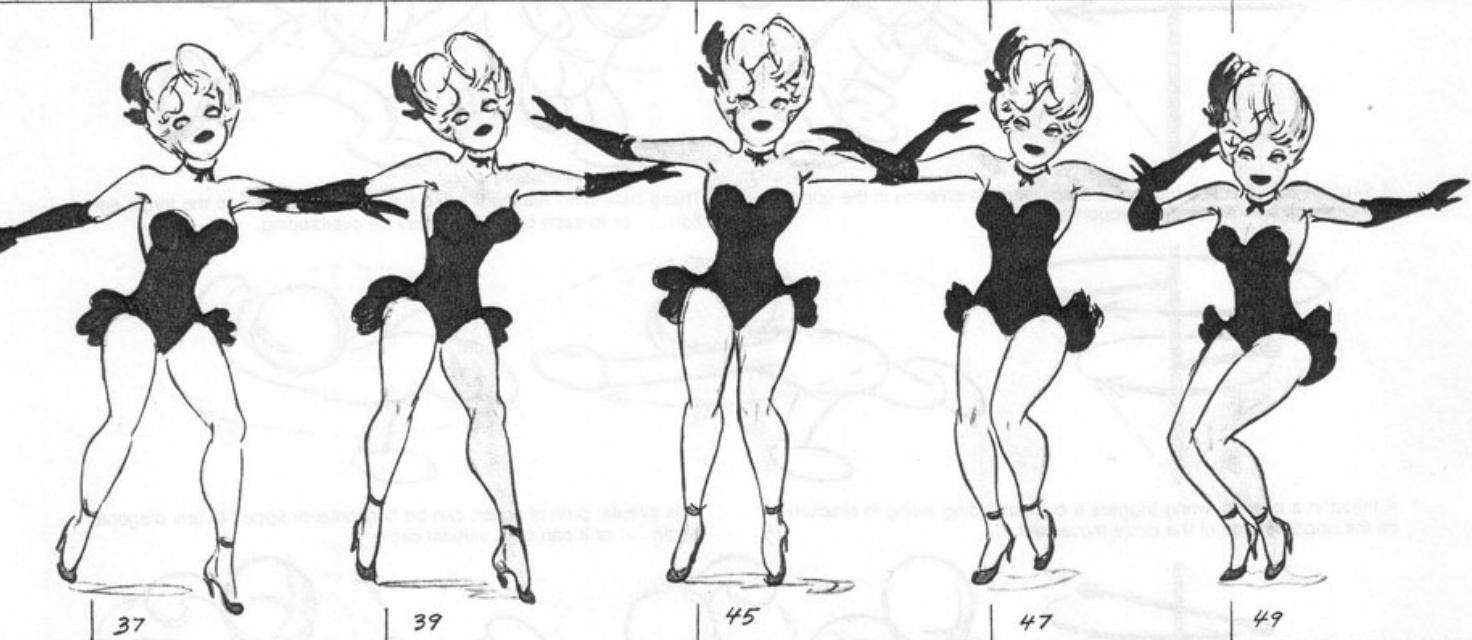
Rhythm lines (left) are often broken and they may jump between parallels. A series of objects or spots can create a line. **Opposition** of lines is important. Verticals oppose horizontals, and angles and arcs oppose (above). The rabbit and elf are examples of opposing arcs or rhythm curves. **Accents** in lines occur at breaks or intersections by other lines or objects. They add to design interest and cut monotony.

Repetition of lines in different parts of cartoon adds contrast to opposition lines. **Line of Action** is sweep of basic forms from legs through head. Weave these forms together to give rhythm and movement. **Contrast** of lines helps design. Verticals, diagonals, and horizontals with angles contrast and oppose rhythm curves and arcs. **Geometric Shapes** should be in sharp contrast for design and character definition.



HERE ARE SOME ROUGH SKETCHES
OF AN OWL--TO SHOW YOU HOW A
BIRD'S WING CAN BE HANDLED--IT
CAN BE STRAIGHT, OR AT OTHER TIMES
TAKE ON ALL THE CHARACTERISTICS
OF A HAND WITH THE FEATHERS AS FINGERS.

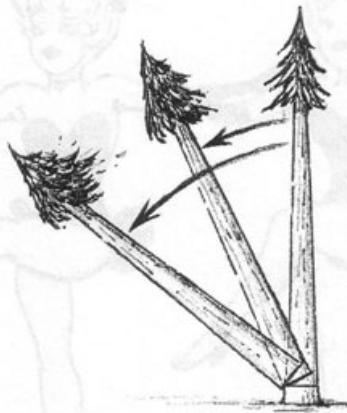




A DANCE KICK

THIS DANCING GIRL RISES FROM A TWIST-POSE (1) AND STEPS (13) INTO A DANCE-KICK (23-31) THEN INTO A BACK-STEP AND SINKING ACTION INTO (49) - A REVERSAL OF POSE (1) (ON 2'S-ON ONLY ODD NUMBERS) THUS THE DRAWINGS (1-49) REVERSED ANIMATE GIRL IN A KICK TO LEFT AND BACK TO (1) FOR A CYCLE - THIS KICK HAS A DOUBLE TOP STAGGER - IN THAT THE ACTION RISES THE LEG TO (23)-SINKS TO (25)-AND RISES AGAIN TO PUSH THE LEG OUT IN KICK AT (27)

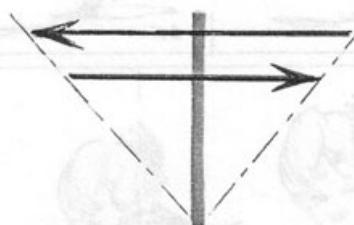
BALANCE & TILT IN MOVEMENT



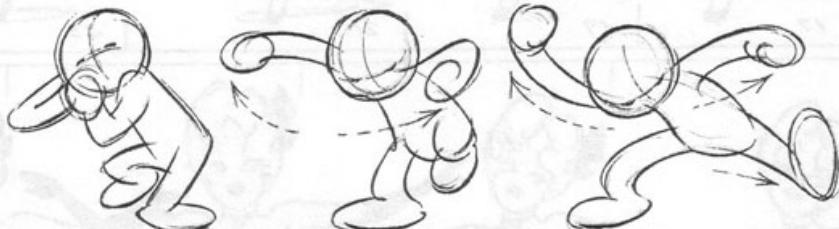
The **Center of Balance** line tips forward in a forward movement in proportion to the speed of the action.



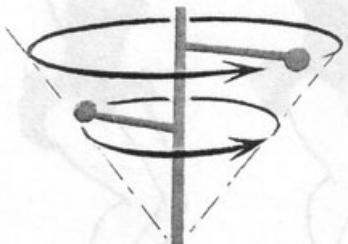
However, characters can run leaning backwards. And, the balance line can be a curve in an action (in any slant).



A thrust in any direction triggers a chain reaction balance in the opposite direction with a speed in proportion.



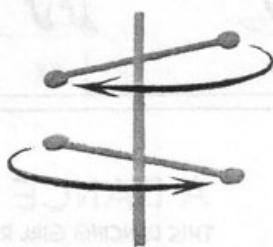
These balancing reactions need not be simultaneous to the thrust action . . . or to each other. They may be overlapping.



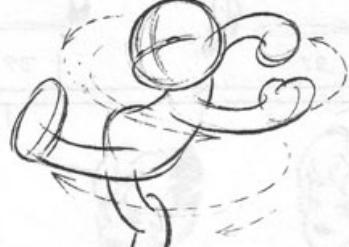
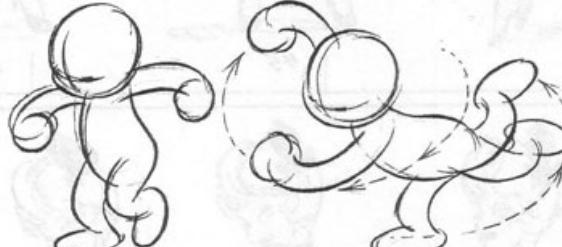
A thrust in a circular swing triggers a corresponding swing in reaction on the opposite side of the circle movement.



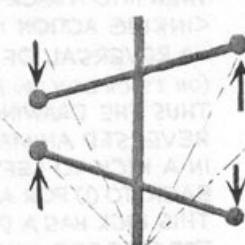
This circular path of action can be horizontal or tipped to any diagonal angle . . . or it can be a vertical circle.



As either the chest or hips twist with a thrust, the other will twist in the opposite direction in a balance reaction.



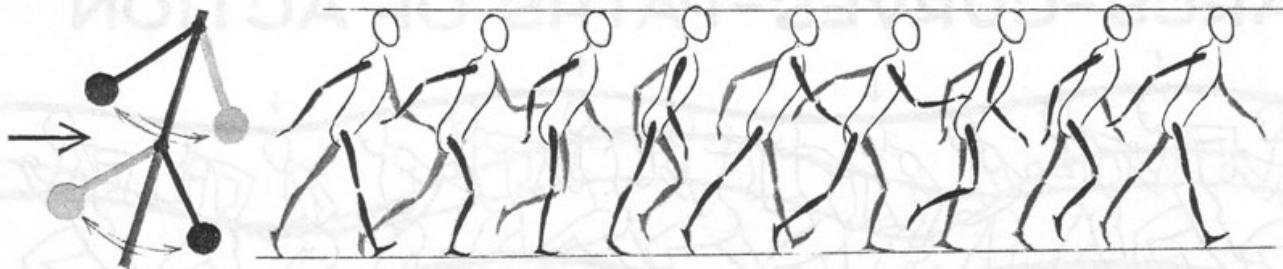
These balancing reactions need not follow the thrust, they may precede, and move before and after the thrust of action.



In a walk or run the hips sag with the leg lifted, triggering a chain balance reaction in tilts of chest, shoulders, head. The arms swing higher on relaxed side, and lower on the other.



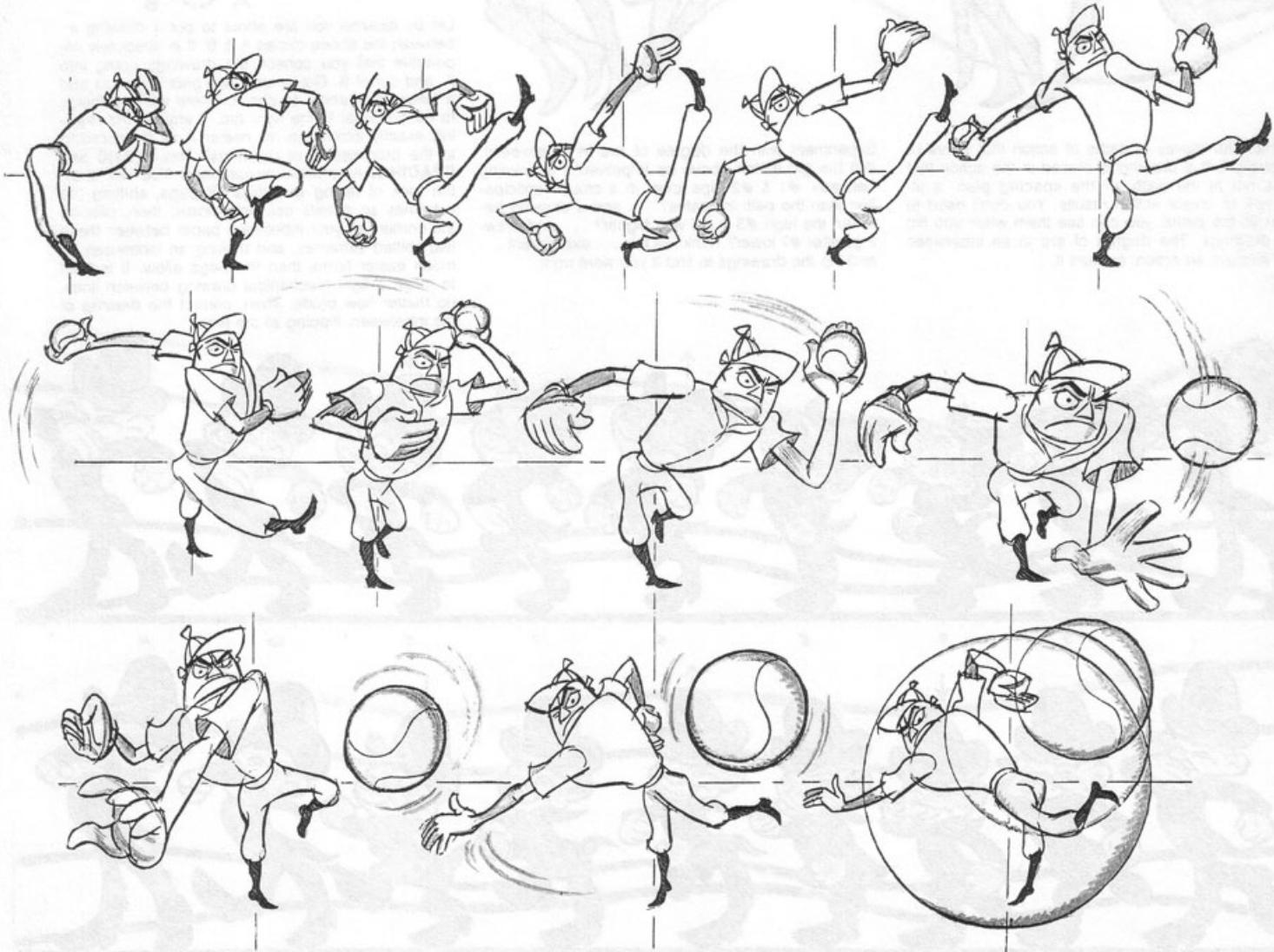
This action gives weight to heavy giants or large animals with a ponderous crashing gait. It is not typical of closely knit athletes. The resulting hip sway is a typical girl move.



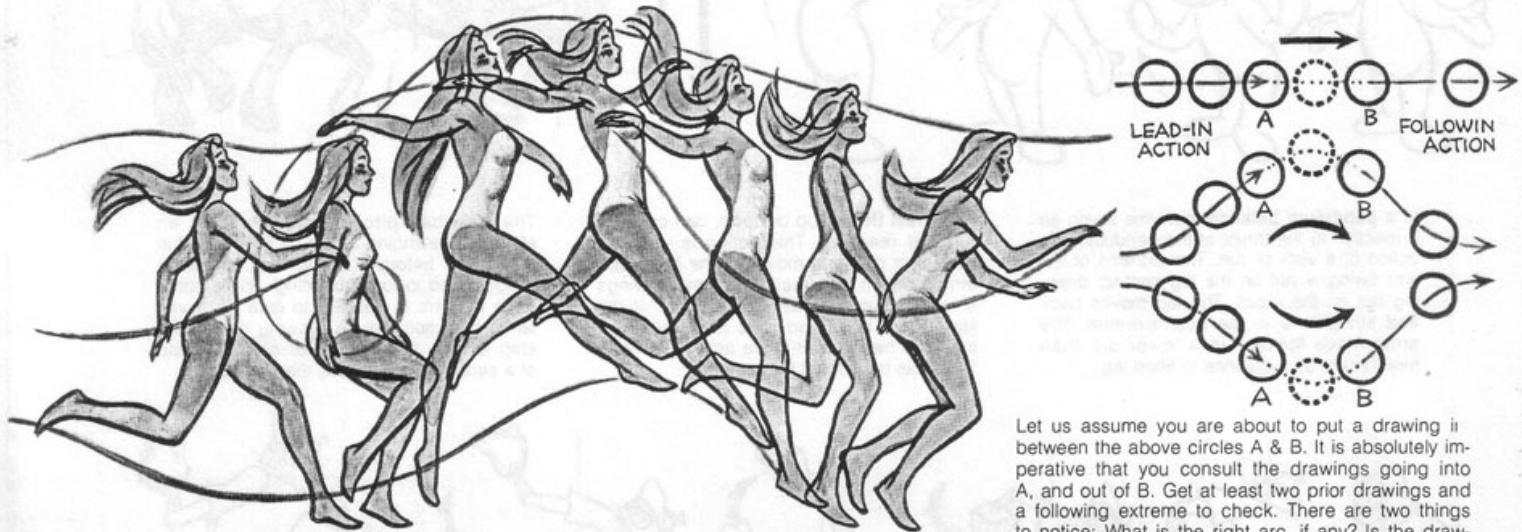
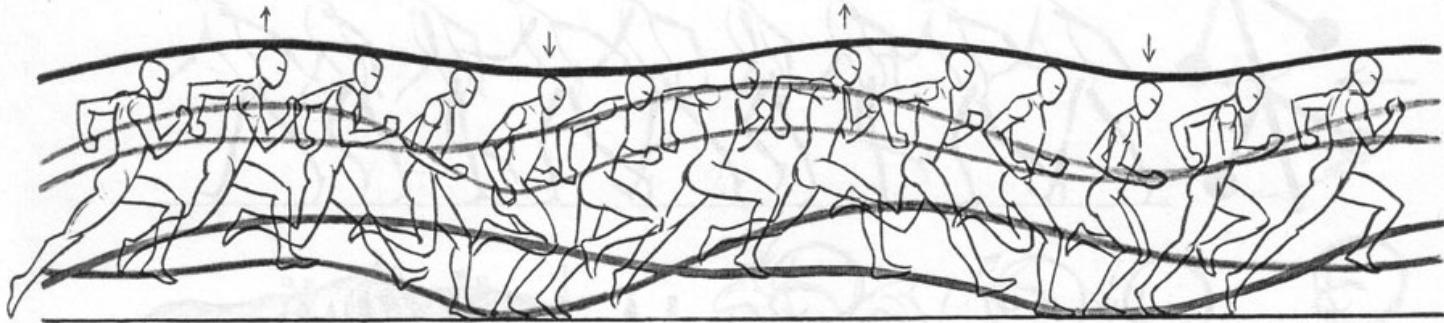
In a **pendulum balance** the arms swing as a reaction to the thrust of the pendulum leg action of a walk or run. The extreme of the arm swing is not on the leg contact drawing but on the recoil. The leg moves back and straightens in the push-extreme. The arms move forward in a lower arc than their return, as a balance to lifted leg.

A **vertical thrust**, up or down, can create a **vertical reaction**. This action is very important in dialogue moves of the head and arms, and in anticipation action drawings of a hunch-contraction into a thrust. If the leg lifts the head and arms react by lowering. In a heavy draft-horse action the head lowers as he lifts leg in a pull.

The baseball pitcher goes through an elaborate balancing act as he lifts his foot in a wind-up before a swing that has been exaggerated in foreshortening. As he starts pitch the arm is delayed to give more violence to action. Single drawing draftsmanship is thus abandoned for draftsmanship of a series we see in less than a second.



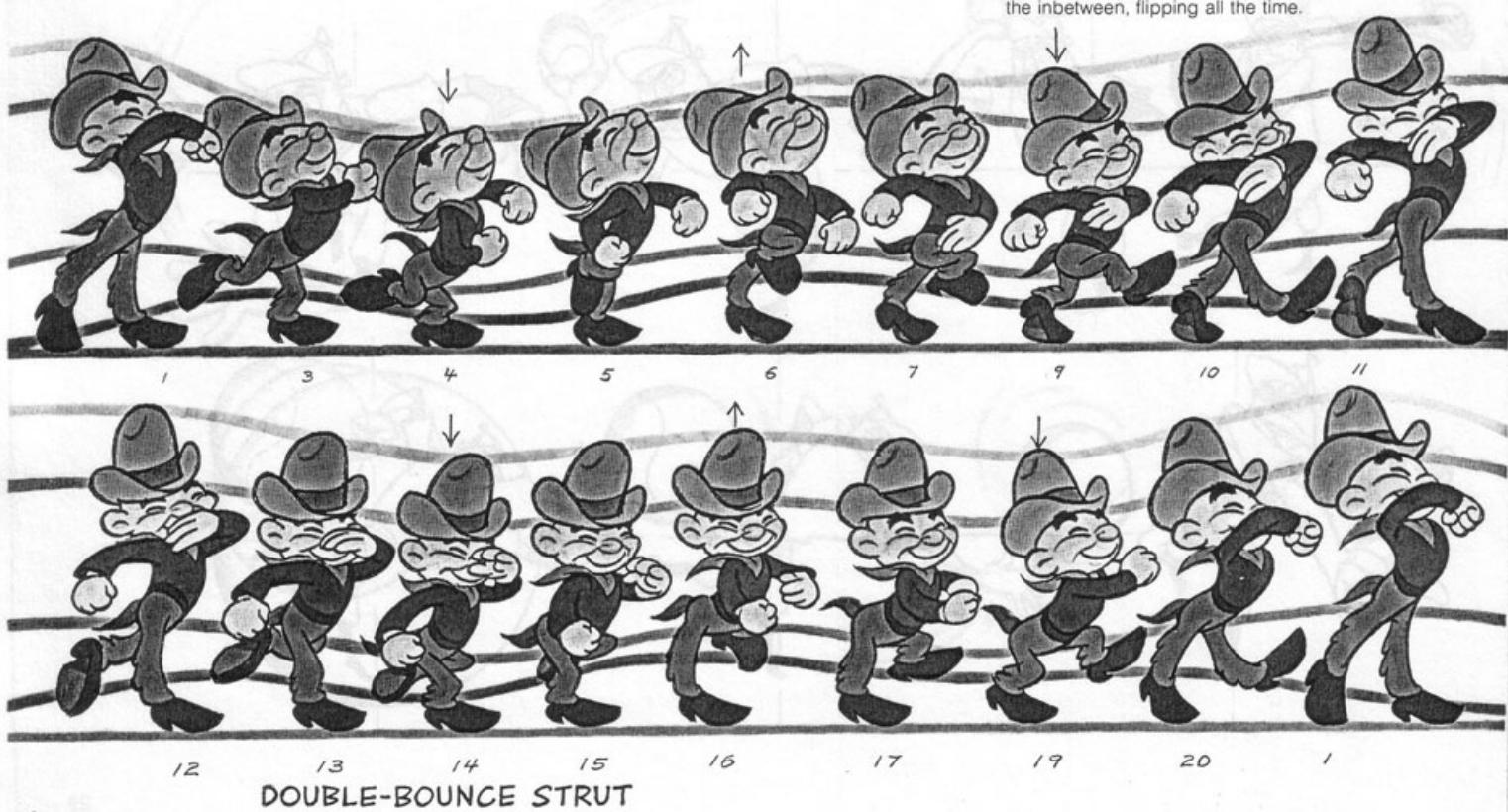
ARCS-CURVES-PATHS OF ACTION



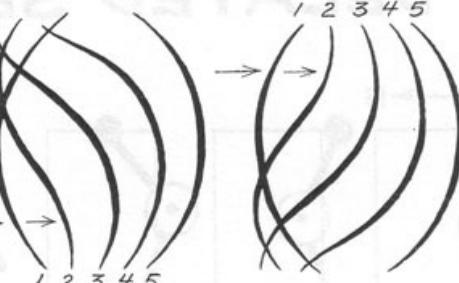
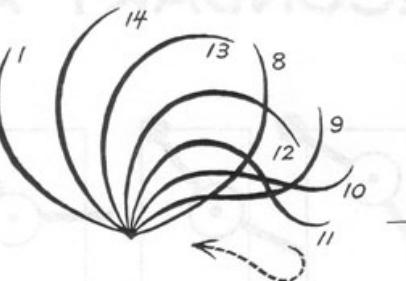
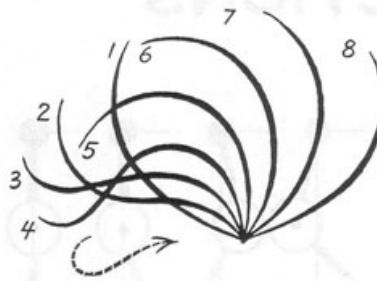
A character moves in paths of action that curve or go straight. If a drawing is placed in the action that does not fit the path, or the spacing plan, a jitter, jerk or unreal action results. You don't need to chart all the paths; you can see them when you flip the drawings. The degree of arc in an inbetween can improve an action, or stunt it.

Experiment with the degree of arc in inbetweens. Will the girl action above be improved if a drawing between #1 & #2 dips lower in a crouch anticipation than the path indicates? . . . and a drawing between the high #3 & #4 was higher? . . . and drawings after #7 lower? Think like this . . . experiment . . . and flip the drawings to find if you were right.

Let us assume you are about to put a drawing in between the above circles A & B. It is absolutely imperative that you consult the drawings going into A, and out of B. Get at least two prior drawings and a following extreme to check. There are two things to notice: What is the right arc, if any? Is the drawing exactly inbetween, or nearer A or B according to the progression of drawings? This is **ARC** and **SPACING**. And then, experiment! You will learn the trick of taking drawings off pegs, shifting the extremes so details coincide closer; then, placing the corners of your inbetween paper between these two shifted extremes, and making an inbetween on much easier terms than the pegs allow. It is best to make a light mechanical drawing between lines, no matter how crude. Then, correct the drawing of the inbetween, flipping all the time.



THE WAVE PRINCIPLE



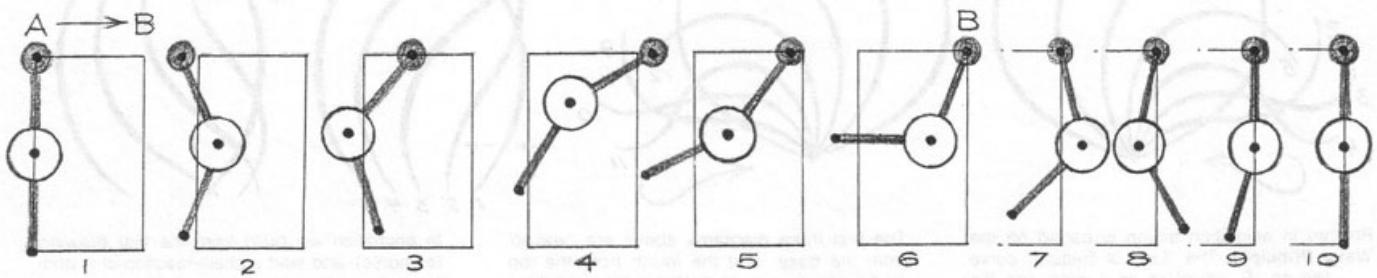
Rhythm in animation action is based on the **Wave Principle**. The "Line of Beauty" curve . . . like an "S" animates as a wave into the opposite "Z" like shape . . . and back. The wave is pushed or manipulated from either side to the opposite side.

The first three diagrams above are "waved" from the base, and the fourth from the top. So be sure to "wave" rhythm in the right direction. The horse "waves" the cowboy around like a flag. The principle applies to all animated curves.

In animation we build from the first drawing (as horse), and start a chain-reaction of rhythm lines "waving." Use second drawing as a guide and when you get there revise it, so it fits your series "wave" progression and progress of anatomy.



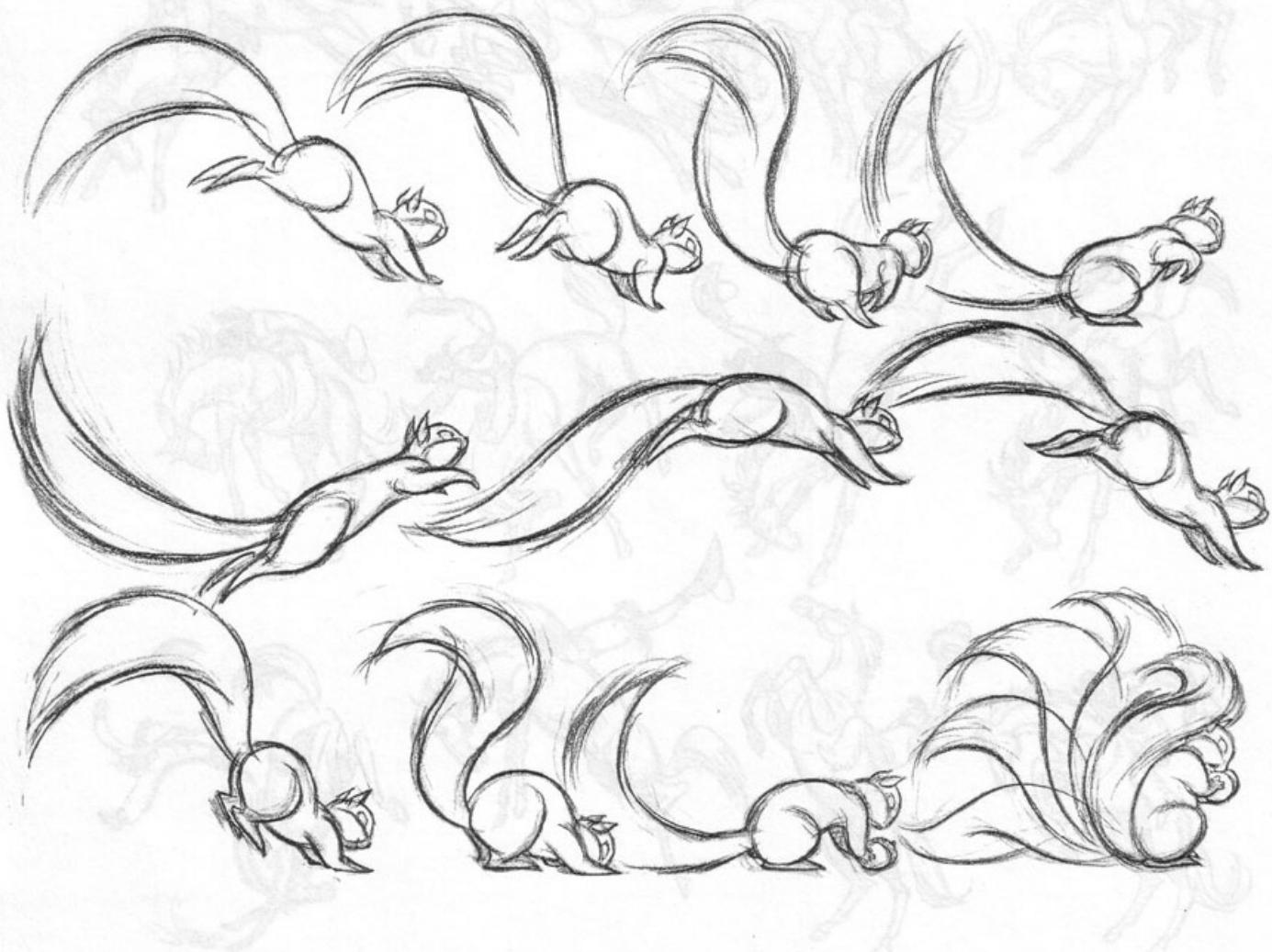
DELAYED SECONDARY ACTIONS



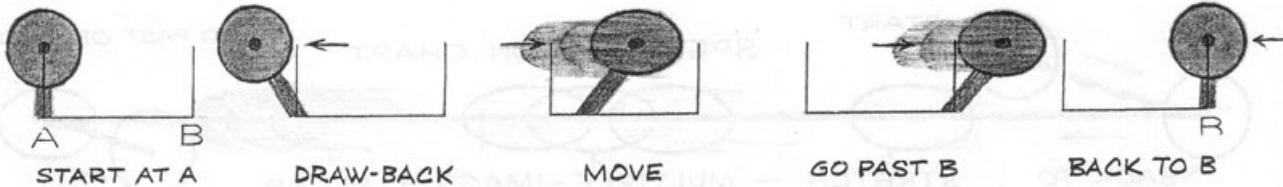
Get **Overlapping Action** whenever you can. That is when animating a character from one point to another, don't go there with all parts of the character at once. Instead, arrive late with **Delayed Secondary Actions** as illustrated on this page. Always get a good **Follow-Through** on secondary loose moving things, like coat-tails, hair, ears, tails, etc. In the squirrel action below, the feet arrive first, then the body rises, after this the arms could arrive, followed by the tail.

The double pendulum action above illustrates a primary action of the dark circle from A to B, followed by two secondary actions of the pendulums. The principle is applied in the action of the dog grabbing a butterfly with the primary action of his arms. His hips and body are similar to the top pendulum, and his feet and tail are secondary to his hips, as the lower pendulum diagrams. The principle is also at work in his head which pendulums from his arms, and ears pendulum from head.

Delayed secondary actions are effective in putting life into poses and holds. A chain of parts can arrive late at different times, in different timings to take the curse off any held drawing. Then, various parts, like the eyes, can "telegraph" the next move in secondary actions that precede. Thus limited animation for TV can become very convincing. This is not economy animation formula, however. It is based on life. Nothing moves in equal compartments of all parts in unison.



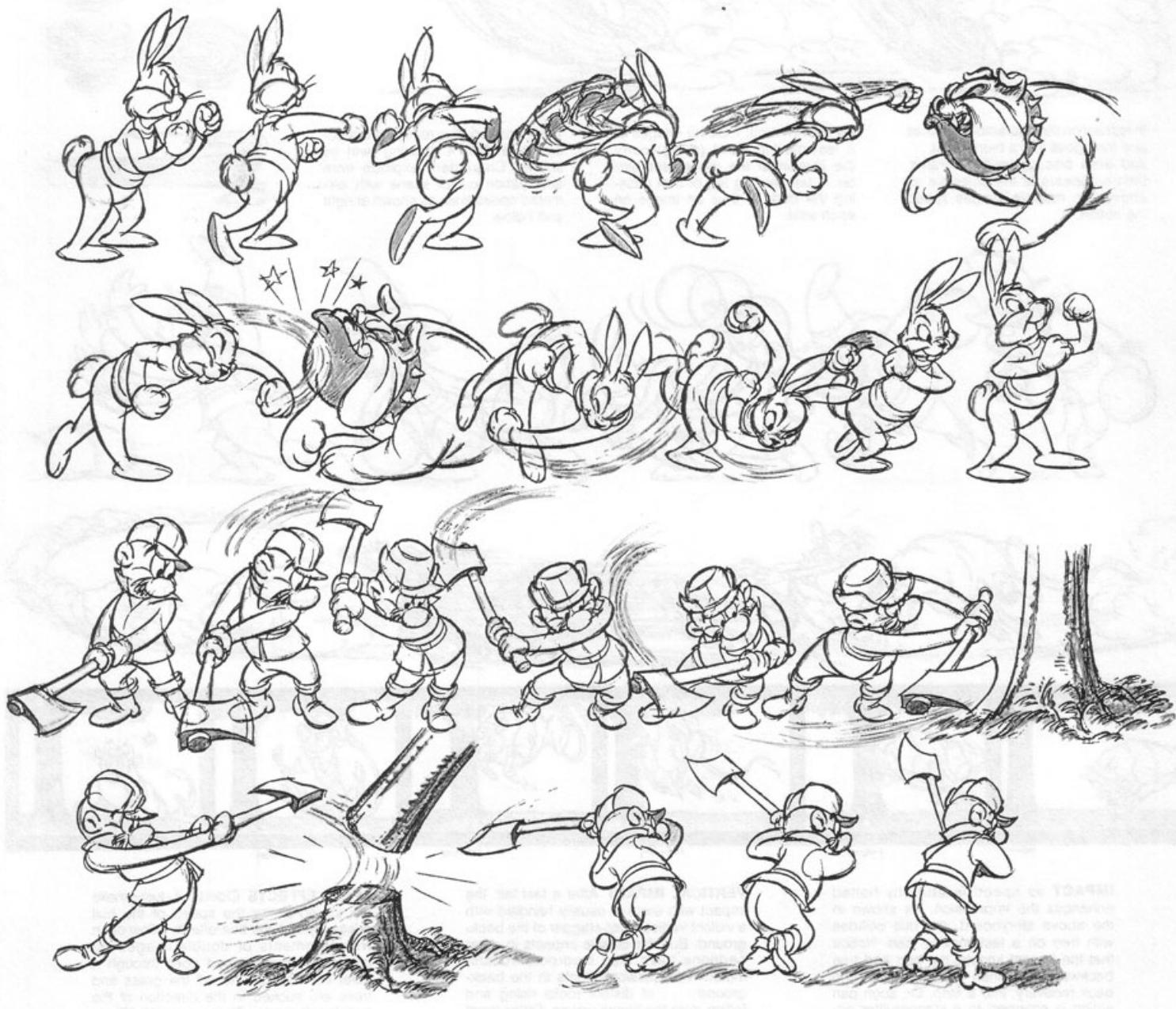
ANTICIPATION/ACTION/REACTION



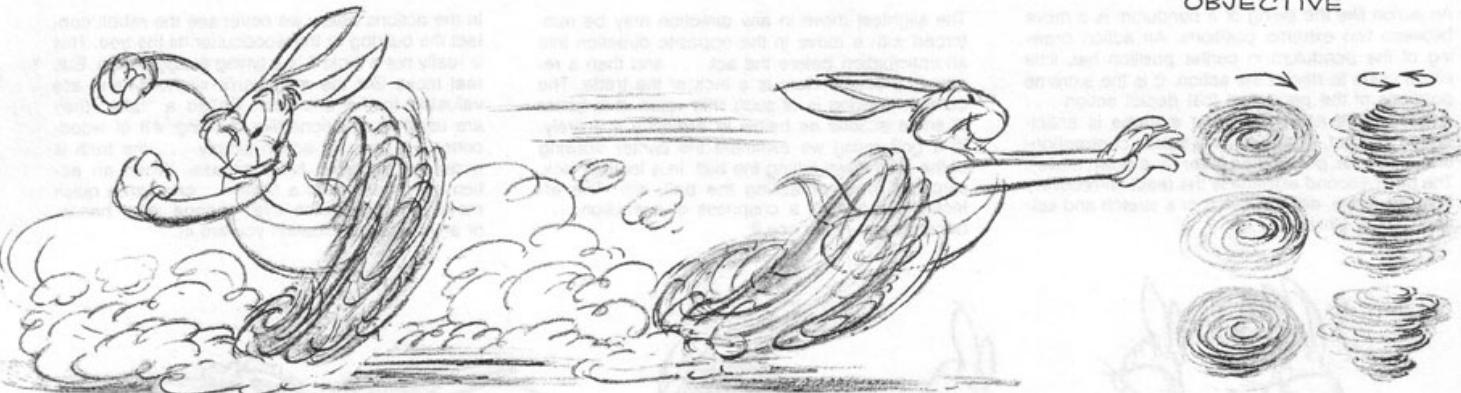
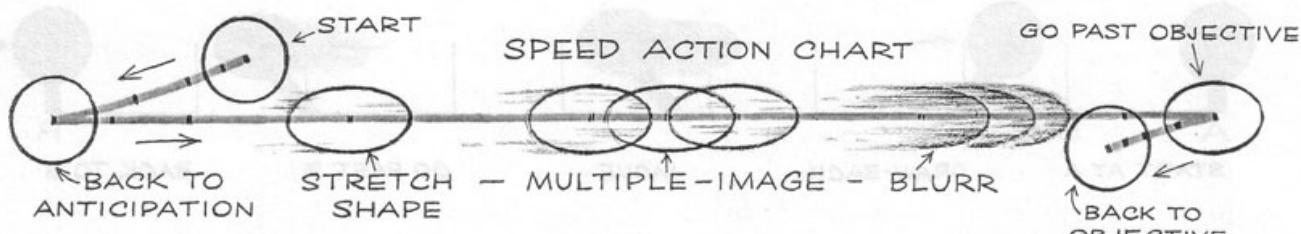
An action like the swing of a pendulum is a move between two extreme positions. An action drawing of the pendulum in center position has little visual value to depict the action. It is the extreme positions of the pendulum that depict action . . . and measure it too. The first extreme is anticipation get-set, wind-up, pull-back, contraction-crouch, or rise, pull-up (the latter for a down move). The other second extreme is the reaction-recovery from the move, either a crash or a stretch and settle that may vibrate.

The slightest move in any direction may be reinforced with a move in the opposite direction into an anticipation before the act . . . and then a recovery process. Here is a trick of the trade: The contact drawing is of such little value, it is better in some actions as below to eliminate it entirely. In a golf swing we eliminate the center drawing of the club down hitting the ball. In a football kick, skip the foot contacting the ball, etc. The effect of the trick is a crispness of execution . . . because you never see it.

In the actions below we never see the rabbit contact the bulldog or the woodcutter hit the tree. This is really not a trick, it is a timing exaggeration. But, real tricks like the magician's slight-of-hand are valuable to the animator. Called a "fake" they are used in situations like drawing #8 of woodcutter. His axe fits action simply . . . the truth is a quick confusing twist on axe. When an action is concealed for a flash . . . or when a quick movement loses the eye, change legs, hands, or any awkward situation you are in.



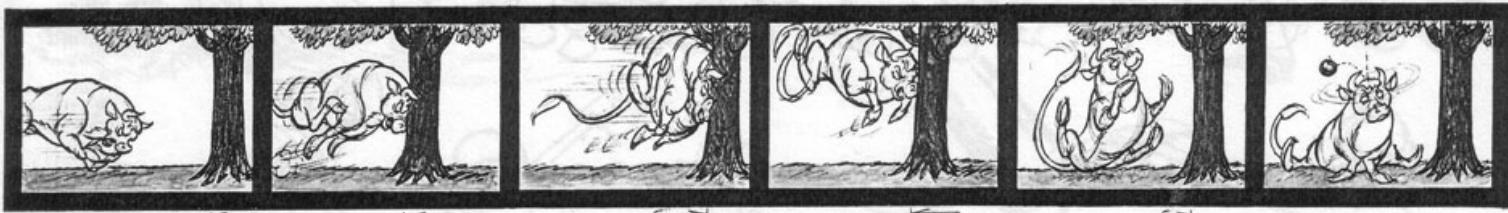
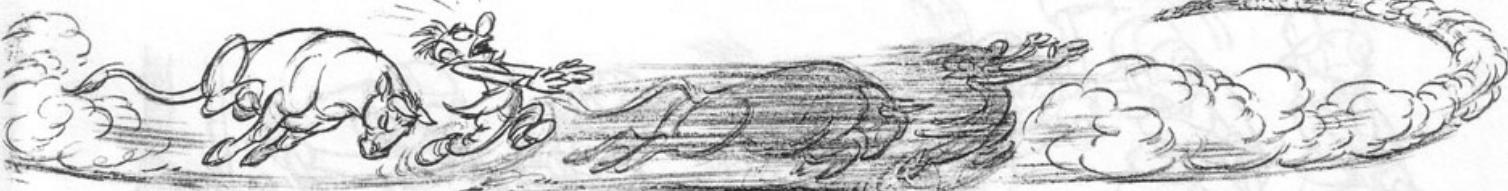
SPEED - FAST ACTION - IMPACT



In fast action the character stretches and then goes into a blurr effect . . . and even disappears for a frame, then reappears at the objective as above. Or, multiple images speed the action.

As shown in elf, multiple images of a fast moving hand (or leg) carry the illusion of the movement better. A fast moving leg or arm passing the body is thus an image on each side.

The animated blur replaces leg action in a 3 or 4 drawing twirl as shown. Characters explode from anticipation out of scene with animated speed lines as shown at right and below.

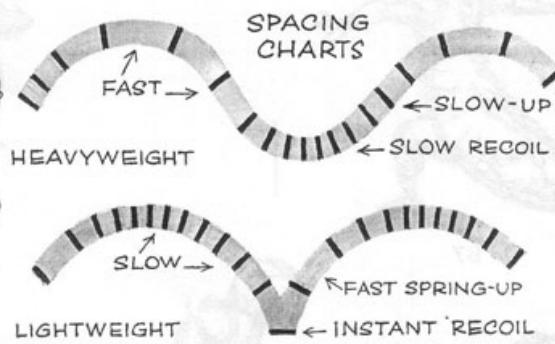
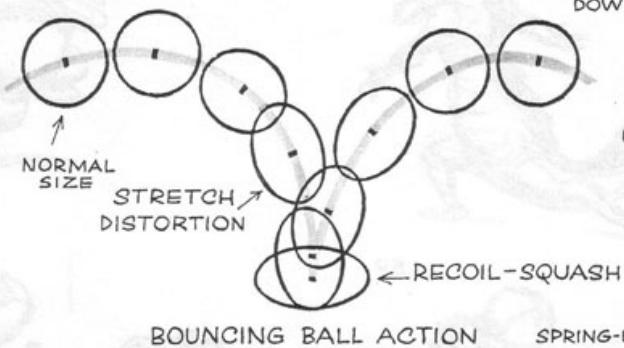


IMPACT as speed is abruptly halted enhances the impression. As shown in the above storyboard, the bull collides with tree on a fast moving pan. Notice that the impact knocks the pan and tree backward, and then into a forward and back recovery, into a stop. Or, such pan action is enlarged to a stagger-jitter action. Or, bull goes into a stagger action after impact.

VERTICAL IMPACT After a fast fall, the impact with earth is usually handled with a violent vertical jitter-stagger of the background. But, the classic impacts in great cartoons have also incorporated animated repercussion effects in the background . . . of distant rocks rising and falling from the shock-waves. Other great impacts have created animated craters and smoke.

SPEED EFFECTS Clouds of dust-smoke are stirred-up by the speed of the bull chase. Speed line blur-effects follow often with fragments of double-images included. As such speed goes through a quiet still background, all the grass and trees are sucked in the direction of the passing tornado. These special effects involve animated backgrounds—such are classics.

WEIGHT - RECOIL & EFFECTS



Weight is registered in animation by:

1. The visual struggle to move weight.
2. The visual effects of stopping weight.
3. The timing caused by immobility-gravity.
4. Chain-balance due to types of sag.

Light Weight is registered by:

1. The spring-up with no resistance.
2. The elimination of recoil processes.
3. Timing caused by mobility and float.
4. No sag, stress, strain, or squash.

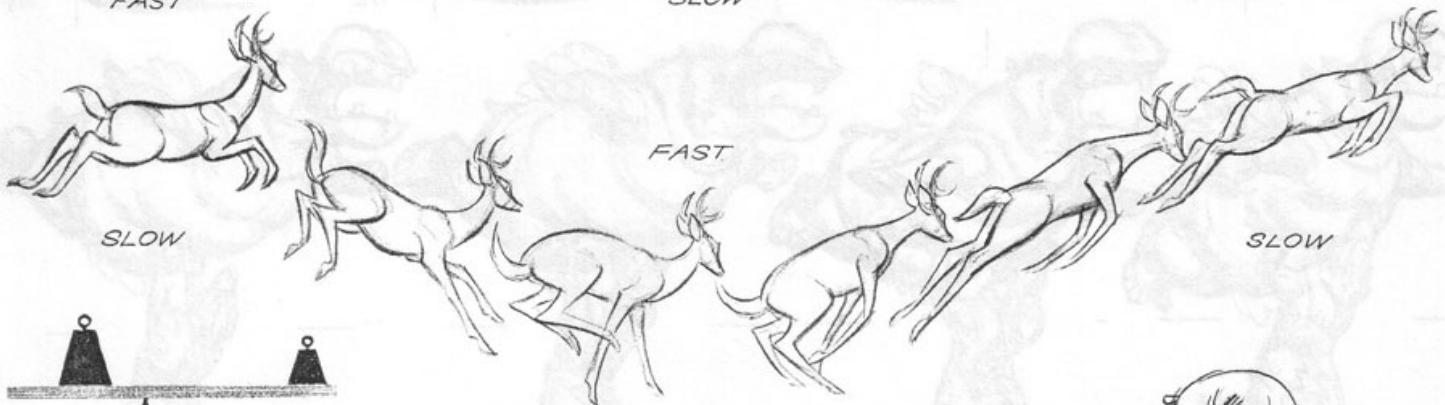
The bouncing ball principle illustrates the basic recoil-squash-contraction, and the stretch-elongation that is a part of most character movement. The elephant shows overlapping squash-recoil and strength.



FAST

SLOW

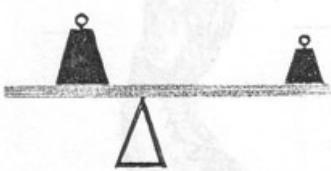
FAST



SLOW

FAST

SLOW

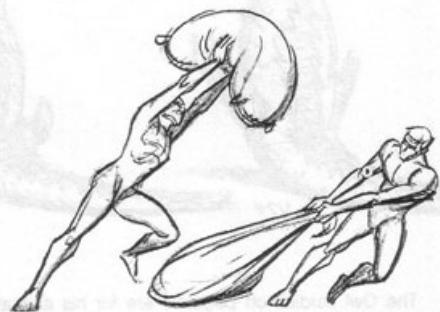


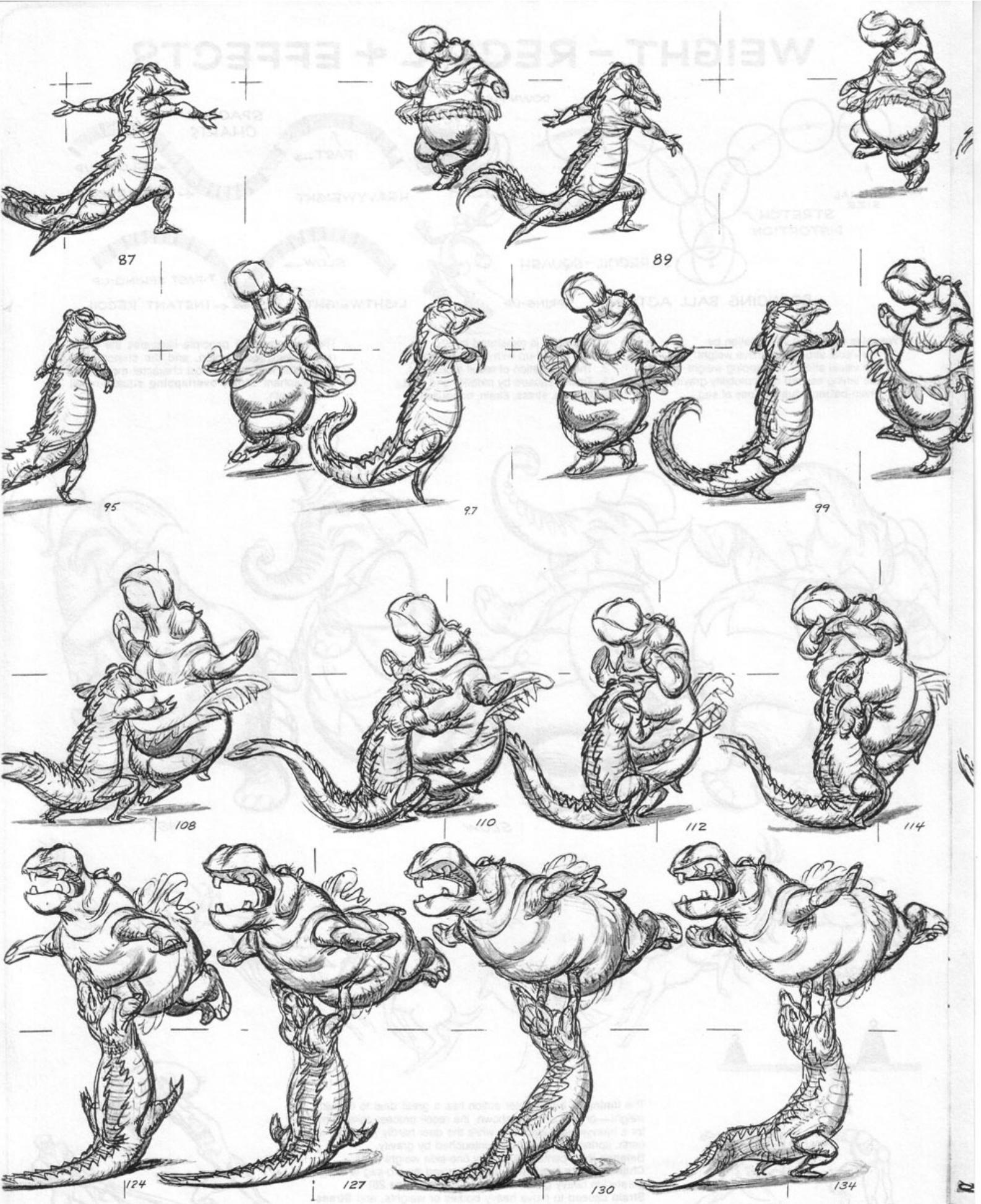
The **timing** of a character action has a great deal to do with weight—or lack of it. As shown, the recoil process takes time for a heavyweight elephant, while the deer hardly touches the earth, springs-up, and floats untouched by gravity.

Balance is off-center caused by one-side weight (left).

Chain-balance in a figure action caused by hip-sag is exaggerated in heavy giants and animals. (see Page 28)

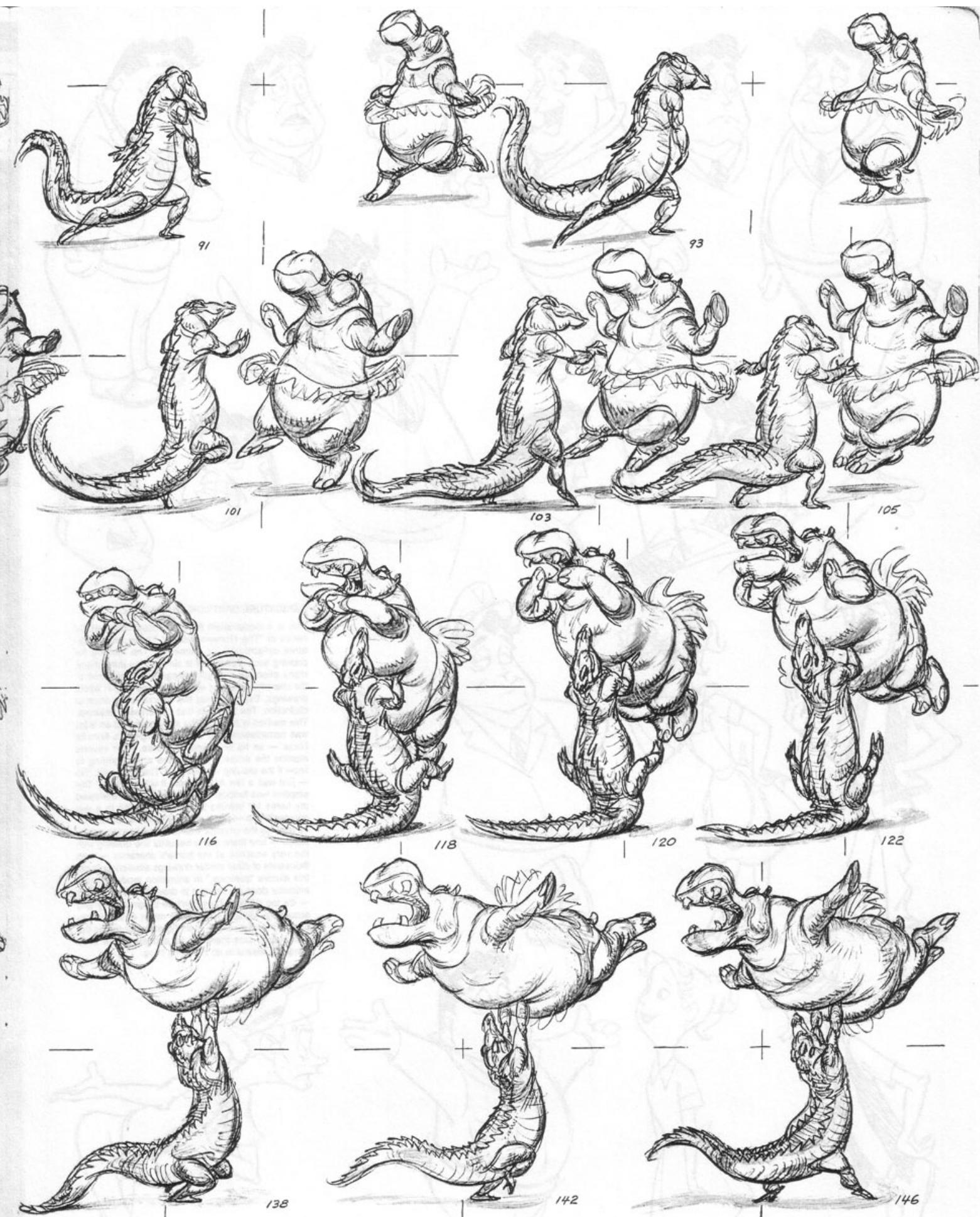
Strain caused to move heavy bodies or weights, and **Stress** in pulled and pushed anatomy, shows weight. (right)





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The Owl studies on page 25 are for his animation in "Bambi" of the Owl at the film's start, and later of the Owl's "twitterpated" pantomime speech on love. In "Pinocchio," Blair animated the Fox and Cat as they lead the hero astray singing: "Hey-diddle-de-dee, it's an actor's life for me!" W.F.



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In this experimental animation for Disney's "Fantasia," the hippo was conceived. Model sheets were made of her by Preston Blair, and he animated her in the ballet. In "The Sorcerer's Apprentice," Blair animated Mickey as he awakens, tries to stop the brooms, but is instead thrown in the vat.

W.F.

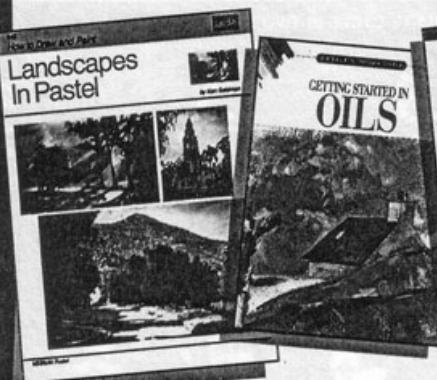


CARICATURE CARTOON CHARACTERS

This is a model sheet for a proposed animated TV series of "The Honeymooners." These are caricatures constructed for animation. The method for drawing such caricatures is simple. You draw many, many attempts until you recognize the essence of the character cropping up in parts, and then in whole drawings. Everyone has this character essence of distinction. The trick is to find it in drawing attempts. This method is ancient. The story goes that an artist was commissioned to draw the emperor's favorite horse — so he borrowed the horse. After several months the emperor visited the artist wanting to know if the drawing was finished. The artist said, "No — just wait a few minutes and it will be done." The emperor was furious. "You mean you have borrowed my horse for months to make a drawing in a few minutes?" "No — just a moment" said the artist. After 15 minutes the emperor was escorted into the artist's studio — and there was a beautiful line drawing with the very essence of the horse's character — with thousands of other similar drawings attempting to get this elusive "essence." In animation production the animator does not attempt to draw these caricatures — it's too difficult. They can't be drawn quickly and accurately. Multiple models are made of the caricatures from every angle, then the animator traces the caricatures, cuts them out for a paste-up, or uses computer means to do the same thing.

Walter Foster

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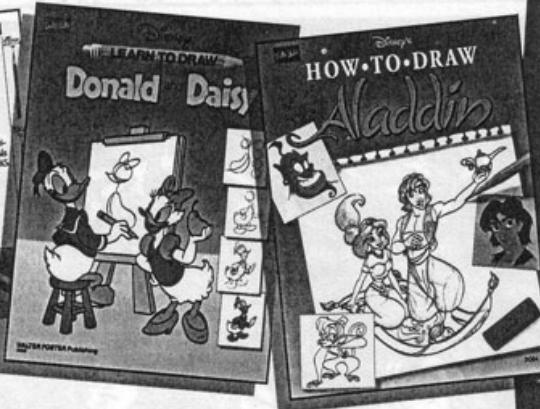
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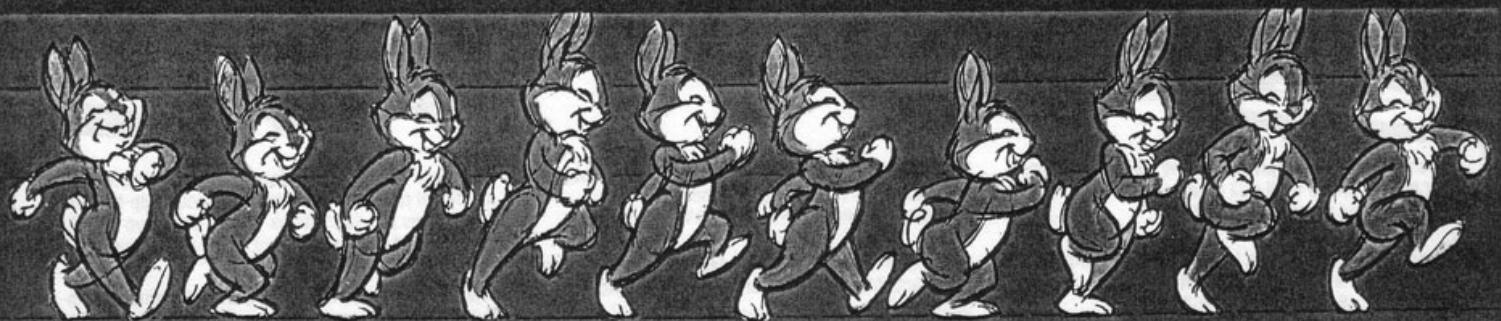
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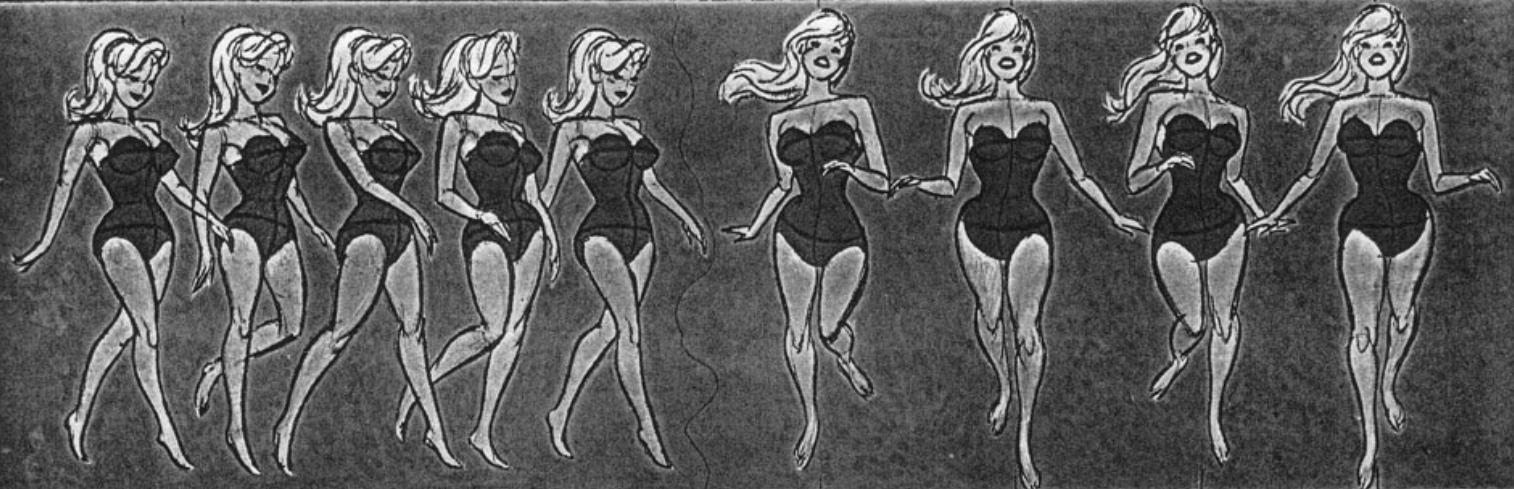
FOUR LEG WALK — THE BACKLEGS ARE ONE HALF STEP AHEAD OF THE FRONT LEGS. THIS COMPLETE CYCLE IS TWO STEPS.



TRANSVERSE GALLOP — BOTH LEFT LEGS LEAD HERE. CAT ALSO GALLOPS LIKE HORSE BELOW WITH RIGHT LEGS LEADING. JUST REVERSE LEGS.



COCKY BOUNCE WALK — ARMS SWINGING — FIRST DRAWING IS CONTACT, NEXT IS RECOIL, THEN A LIFT, THEN A HIGH, FLOAT, INTO CONTACT.



WALK — AS LEG LIFTS HIPS TILT. CHEST TILTS OTHER WAY TO BALANCE.

RUN — ARMS LIFT AND SWING TO BALANCE HIP TILT AND LEG ACTION.



TROT — OPPOSITE LEGS LIFT AND CONTACT TOGETHER IN SYNC. IN A PACE ACTION SEE THE SAME FRONT AND BACK LEGS WORK TOGETHER.



CANTER — THE BODY TILTS WITH A RISING AND FALLING ACTION THAT IS SIMILAR TO A CHILDREN'S SEE-SAW, CAUSING RIDER TO STAND.



TRANSVERSE GALLOP — LEFT LEGS CAN LEAD TOO. THE SAME LEGS LEAD UNLIKE DOG AND DEER THAT GALLOP WITH OPPOSITE LEGS LEADING.